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No. XV. OF VOL. I., 1932. LONDON, SATURDAY, APRIL 9, 1932 Pp. 120—Price 1s.
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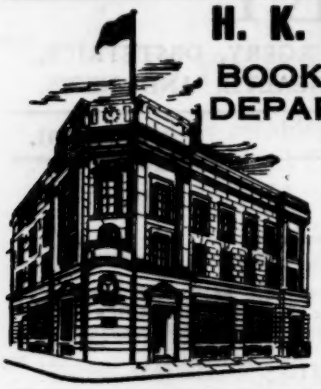

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ADDRESSES AND ORIGINAL ARTICLES

THE RÔLE OF THE HÆMOLYTIC STREPTOCOCCI IN INFECTIVE DISEASE.

By C. C. Okell, *M.C.*, M.B. Camb., M.R.C.P. Lond.,
PROFESSOR OF BACTERIOLOGY IN THE UNIVERSITY OF LONDON, AND BACTERIOLOGIST TO UNIVERSITY COLLEGE HOSPITAL, LONDON.

LECTURE I.

THE HÆMOLYTIC STREPTOCOCCI AND THEIR MODES OF ATTACK.*

The literature relating to the streptococci is almost unbelievably extensive. The editors of the exhaustive catalogue of streptococcal literature published by the Pickett Thomson Laboratories estimate that their completed work will contain more than 10,000 references. In the present state of knowledge it would be idle to pretend that any satisfactory integration of this material can be achieved, but everyone who has to deal with streptococcal disease, in the laboratory and field, must needs have his own view of the unities and essentials which shall be his guide when faced with actual clinical and epidemiological problems. In these lectures it is my purpose to present one such personal view. The subject at least falls within the compass of the Founder's Suggestions, as it will be generally agreed that there are few subjects of greater epidemiological interest than streptococcal disease.

Classification.

At the outset of any discussion of the streptococcal problem we are met by the fundamental difficulty of having to conduct an argument the terms of which are ill-defined. Practical knowledge in the prevention and treatment of streptococcal disease must advance slowly while definition and classification remain in this present unsatisfactory state. This has been so generally recognised during recent years that possibly more attention has been paid to classification than to any other aspect of the subject. It seems then that this necessary preliminary to further discussion should be considered in some detail.

The streptococcus first named by Billroth in 1874 and given a definite generic position ten years later by Rosenbach is not more difficult to define than other genera of bacteria. On morphological grounds alone there is little difficulty in including or excluding a given example from the genus. The difficulty arises when we try to assign to the streptococci specific names of any importance, particularly those which carry a pathological implication. The bacteriologist here as elsewhere in so much of his work must steer a precarious course between the Scylla of pathological and the Charybdis of botanical classification, keeping a weather eye on either bow. A number of methods present themselves which may be used in dividing the streptococci into subgroups, such as fermentation reactions, agglutination tests, hæmolytic tests, tests for pathogenicity in animals or the believed potentialities of the streptococci as judged from their effects in natural disease. Each of these methods calls for some consideration.

CLASSIFICATION BY FERMENTATION REACTIONS.

The attempt to classify the streptococci by means of fermentation tests was first made on an intensive scale in 1903 by Mervyn Gordon,[1] who showed that by the use of a comparatively simple series of chemical substances the streptococci commonly met with could be classified into a number of groups. The materials used were milk, neutral-red, sucrose, lactose, raffinose, insulin, salicin, coniferin, and mannite. Some three years later Andrewes and Horder[2] making use of Gordon's methods published their Study of the Streptococci Pathogenic for Man. This paper constitutes an important landmark of streptococcal literature, and deals with other aspects than fermentation reactions, but at the moment I shall only refer to their views on classification. Unfortunately neither Gordon nor Andrewes and Horder gave more than passing attention to Schottmüller's division of the streptococci into hæmolytic and non-hæmolytic, but it is obvious that by their method, what we should now call the hæmolytic streptococci were divisible into two groups to which, after a thoughtful discussion of the dangers of bacteriological classification, Andrewes and Horder rather inconsistently gave the specific names, based essentially on fermentation reactions, of *Streptococcus pyogenes* and *Streptococcus anginosus*.

Although Andrewes and Gordon found their *S. pyogenes* commonly associated with suppurative conditions and their *S. anginosus* with inflammation of the throat including scarlet fever, the conclusion to be drawn from their work is that, though Gordon's tests provide a valuable and consistent method of study they fail to classify the streptococci satisfactorily in terms of pathogenic potentialities. For example, with regard to the scarlet fever question, they state that they "failed to indicate one variant as constant in or peculiar to the scarlet fever throat." Another who from the thoroughness of his work demands consideration is W. L. Holman.[3] His method was a simplified one combining Gordon's tests with Schottmüller's blood-agar plate method, the fermentable substances he eventually employed being lactose, mannite, and salicin. By this method Holman divided the streptococci into eight hæmolytic and eight non-hæmolytic varieties. In this way the matter was carried to a stage which Andrewes and Horder would have undoubtedly reached had they given more weight to Schottmüller's classification. Holman's conclusion as to the pathological value of his method is summed up in the statement that "the streptococci are not specific in their disease production, at least so far as I have been able to determine." I have recently examined some 30 hæmolytic strains from diverse streptococcal diseases on a large range of the fermentable substances generally used in the laboratory. Another 71 strains were examined by Holman's simplified method, but in neither series could I find any grouping that could be linked with the clinical condition. With regard to scarlatinal strains the only statement that can be made is that they generally fail to ferment mannite.

The hæmolytic streptococci all appear to ferment the simple carbohydrates, but their powers of attacking the more complex reagents vary greatly even among strains from the same type of disease. Individual strains are remarkably consistent but by no means always so.

We may conclude then that fermentation tests are useful in identifying a particular individual strain of hæmolytic streptococci, but fail in supplying a method of classification of pathological importance.

CLASSIFICATION BY AGGLUTINATION.

Agglutination tests provide a very delicate method for differentiating bacteria but one which may easily

* The first Milroy lecture for 1932, delivered before the Royal College of Physicians of London on Feb. 18th.

transcend the requirements of both taxonomy and pathology. One need hardly mention that such well-defined bacterial species as the toxigenic bacilli of diphtheria and tetanus can be divided into consistent serological subgroups by these means. Yet it is admitted that these subgroups are of little practical importance. It has recently been realised that, for other reasons also, great caution must be employed in applying serological methods to bacterial classification. The work of Arkwright, Weil and Felix, and others on the peculiar features of bacterial variation has shown that most bacteria have a complex antigenic constitution, above all that they may exist in a "phase" for a number of generations when one antigen is dominant, eventually undergoing a *reversible* change to a phase in which another character takes the leading place. Thus agglutination methods at the present time have become a means of study of the variable rather than the consistent characters of bacterial species. Until the consistent antigens of a species are analysed and separated from those that are accidental and variable no serious application of antigenic criteria to the classification of bacteria can be attempted. In the cases of such fully studied groups as the salmonellas and the pneumococci we have perhaps reached the necessary degree of analysis but this certainty cannot be claimed for the streptococci. There is abundant reason to suppose that the antigenic structure of the hæmolytic group of streptococci is complex, and we have probably to recognise that they possess group and specific and possibly rough and smooth antigens. The work of Lancefield,[4] while it may eventually supply a method of attack, for the moment only makes the serological classification of the streptococci more precarious. This worker has done something to analyse the antigens present in the hæmolytic streptococci. She has separated three different bodies of immunological importance: (1) an antigenic nucleo-protein which is non-specific, overlapping with similar antigens from non-hæmolytic streptococci, pneumococci, and even the staphylococci; (2) a "type-specific" protein peculiar to the strain or to a certain number of strains and which she states is non-antigenic; (3) a "species-specific" carbohydrate apparently common to all hæmolytic streptococci and similar in general properties to the "hapten" of the pneumococcus, this being, of course, non-antigenic in the isolated state but able to act as a specific antigen when linked normally with bacterial protein. The quantitative redistribution of these antigenic factors in the history of an individual strain may obviously be a source of serological confusion.

There is a good deal of evidence, though admittedly of an indirect nature, that suggests that the agglutinogenic constitution of bacteria may change during sojourn in the body, particularly if they are present without actively producing disease. Eagles [5] came to the conclusion that as cases of scarlet fever progress the streptococci from them become gradually and progressively less specific in their agglutination, so that in the end they can no longer be identified by these means. Gunn and Griffith's [6] observation that in 50 out of 100 scarlet fever cases a change of type took place during the course of the disease is explained by them as due to reinfection, but the alternative view might be taken that the individual strains had undergone a change of antigenic structure. It is possible too that the diphtheria bacillus undergoes a similar change of serological constitution in the throats of convalescents from diphtheria. The mechanism of such changes if they really take place is difficult to imagine, but Griffith's [7] amazing observation that one serological type of pneumococcus can acquire by contact the substance chemically and serologically characteristic of another type and moreover become permanently endowed with it, teaches us how little we yet understand of the principles underlying agglutination.

The technical methods used in much of the work done on agglutination makes little allowance for the complexity of the problem. They are arbitrary methods which are likely to emphasise certain antigenic properties at the expense of others and thus give a distorted notion of the true state of affairs. Owing to the almost universal tendency of streptococci to sediment rapidly when suspended in saline, considerable difficulty has been met with in carrying out satisfactory agglutination tests with them. In the last decade these difficulties have been in a large measure overcome and we are now in possession of a body of results upon which some reliance can be placed. An array of workers, among whom are Gordon,[8] Bliss,[9] Havens,[10] Stevens and Dochez,[11] and Griffith,[12] to name but a few, have shown that serological differences exist among the streptococci. Nearly all these workers have focused on the problem of separating scarlet fever strains from hæmolytic strains of other origin. Opinions as to the success of this attempt have varied greatly even among the workers themselves. The earlier view was that scarlatinal strains represented a stable and homogeneous subgroup, but this has been abandoned with the advance of knowledge. In so far as there has been any success in the identification of scarlatinal strains by agglutination it has been the outcome of the patient work of F. Griffith and his colleagues.

Griffith,[13] using a simple method which overcomes most of the technical difficulties of streptococcal agglutination, has succeeded in "typing" the streptococci occurring in scarlet fever cases into four main agglutination groups. Seventy per cent. of Griffith's series of hæmolytic streptococci from scarlatinal cases were found to fall into these groups, leaving 30 per cent. which form a miscellaneous group composed largely of individualistic strains. The work has proved the more valuable because a number of other workers, notably J. Smith,[14] G. R. James,[15] and Allison [16] have accepted the same grouping while carrying out concurrent work, thus avoiding the confusion which so often arises in independent investigations of this nature. In Griffith's series of 156 typeable scarlatinal strains 6·4 per cent. fell into Type I., 36·5 into Type II., 28·9 into Type III., and 28·2 into Type IV., and in a more recent series of 600 cases examined by Allison 63·4 per cent. fell into one or other of Griffith's groups, 10·8 per cent. were Type I., 22·4 per cent. Type II., 20·2 per cent. Type III., and 10 per cent. Type IV. Griffith formed the opinion that infections with Types I. and II. tended to run a more severe course, and that Type II. infections were particularly associated with complications, points not to be lost sight of in the epidemiology of the disease. Type II. was not at first found by Griffith except in connexion with scarlet fever, but later it was found in cases of tonsillitis without rash and Allison found it in two cases where there was no history of the disease. Five cases of puerperal fever were reported by Griffith in which the streptococci belonged to either Type I. or III. In contrast to the high percentage of "typeable" strains from scarlet fever cases, Allison, among 215 strains from streptococcal conditions other than scarlet fever, has recently found only 2 per cent. to fall within Griffith's four types. The special interest of the work of Griffith and his colleagues is that it shows that in this country at least there are serological strains of hæmolytic streptococci which, from the point of view of scarlet fever, may be called *epidemic* types. When they are met with they allow us shrewdly to guess their source of origin and their potentiality as regards the production of scarlet fever. The designation in this way of consistent types will no doubt admit of the carrier problem being studied with greater precision. We are furnished with the

dossier and marks of identification of the strains which are most likely to give rise to mischief—at least from the official public health standpoint. The absence of a strain from Griffith's four chief types hardly, however, amounts to a presumption of innocence in respect to scarlet fever, nor is its inclusion proof of its guilt.

McLachlan and Mackie,[17] though they took Griffith's grouping as the basis of their work, found that a minority of scarlatina streptococci were agglutinated by antisera for individual strains and they observed no group agglutination. Absorption tests revealed the existence of agglutinogenic constituents common to the majority of hæmolytic streptococci isolated from various sources. I have also found that absorption tests may be made to indicate a very general basic similarity among hæmolytic streptococci from different sources, particularly if heavy absorbing doses are used. McLachlan and Mackie expressed what seems to be the most reasonable view of the place of agglutination in relation to the general problem of classification when they said that "no serological distinction can be drawn between scarlatinal and other hæmolytic streptococci and a 'streptococcus scarlatinæ' group cannot be defined by serological methods." This view is not, as might appear at first sight, incompatible with that of Griffith.

The position is thus much the same as with the meningococci and pneumococci where in larger epidemics certain types tend to recur, yet in inter-epidemic periods the organisms may be serologically heterogeneous.

CLASSIFICATION BY HÆMOLYSIS.

Besredka[18] in 1901 and Marmorek[19] in 1902 pointed out that certain streptococci had the power of laking blood incorporated into the culture medium in which they were grown. There are two main methods for demonstrating this hæmolytic property of streptococci. The first was introduced by Schottmüller[20] in 1903. In this method a suitably distributed inoculum of streptococci is plated on nutrient agar into which is incorporated animal blood. It is not of great importance what animal is used as the source of blood. Sheep, horse, rabbit, and human blood have been used by different workers, and it is agreed that the capacity to hæmolyse the blood from these different sources is very similar though that from the horse and perhaps the rabbit seems to serve the purposes of the test better than others. It is, at times, not easy to draw a definite line between hæmolytic and non-hæmolytic streptococci grown on plates, and small variations in technique and in the constitution of the medium may produce divergent interpretations depending partly upon personal criteria. The detailed study of plate hæmolysis was undertaken by Theobald Smith and Brown[21] in 1915 and subsequently by Brown[22] himself in such detail that little further advance can be expected on this aspect of the streptococcal problem. The well-known method of classification used by these authors into α, β, and γ types has since been the basis of description of most of those who have studied the streptococci. In deference to practical necessities there has been a general tendency to simplify the classification into hæmolytic and non-hæmolytic forms, the former corresponding with the β-hæmolytic type or those which produce a clear zone of hæmolysis around their colonies, and the latter with those that do not fall clearly into the β-type. This method of division, though almost essential in everyday routine, evades in fact the most difficult issue of plate classification—the position of intermediate types.

The second method used in studying the hæmolytic power of streptococci avoids some though not all of these difficulties. This is the method of growing in fluid medium containing blood, which, like the plate test, was first seriously studied by Schottmüller. A convenient mode of carrying out this form of test which has been almost universally used in this country is that of M'Leod[23] who adds 0·5 c.cm. of a 5 per cent. suspension of red cells to a 15-hour culture in serum broth and examines for hæmolysis after an incubation of one and a half hours. There is no reason to doubt that hæmolysis indicated by solid or fluid medium is due to an identical property. The streptococci causing β-hæmolysis on plates give, in the great majority of cases, a positive M'Leod test, but whereas the interpretation of the peculiar appearances met with on plating often proves difficult, the result given by the M'Leod test is nearly always clear. In a recent series of comparisons carried out on 76 strains of "hæmolytic" streptococci, using rabbit blood for both tests, I only met with two strains in which a true contradiction occurred between the two tests, one M'Leod test positive and plate test negative and one the reverse. Four strains were doubtfully hæmolytic with both tests.

HÆMOLYSIS AND PATHOGENICITY.

Of all in-vitro properties bearing on pathogenicity, hæmolysis has attracted most interest. M'Leod,[24] who has perhaps given more attention to the study of this subject than any other modern worker, has summed up the position in the statement "that although the view that hæmolytic activity indicates virulence was unjustified, the opposite statement that there was no connexion between hæmolytic activity and virulence was as unsatisfactory."

There can be little dispute that the great majority of streptococci which cause serious human disease are hæmolytic. What then is the nature of the connexion between hæmolytic power and pathogenicity? The answer to this question, in the light of present knowledge, can only be tentative, but it is none the less worthy of consideration. But before it can be discussed some decision must be arrived at as to the nature of the methods of attack by which the streptococci produce disease.

The Offensive Weapons of the Hæmolytic Streptococci.

ERYTHROGENIC (RASH-PRODUCING) TOXIN.

In enumerating the offensive weapons of the hæmolytic streptococci I shall begin with the one perhaps now the best defined and understood—its exotoxin; as I intend to devote my next lecture entirely to this, I will rest content with a passing mention of it. I propose to call the toxin used in the Dick test and for active immunisation and responsible for the rash in scarlet fever the erythrogenic toxin of the hæmolytic streptococci. I have used this term because of the available adjectives "streptococcal" seems too general and "scarlatinal" too particular, while "Dick" toxin has legal limitations undesirable to accept for my present purpose. I may add that the erythrogenic toxin is neither hæmolytic nor pyogenic, nor is there any evidence that there is any direct connexion between the toxicity of streptococci and their pyogenic and invasive powers. The available evidence, which will be referred to later, suggests that the erythrogenic toxins of streptococci from the most diverse sources in human disease are immunologically identical.

PYOGENICITY.

The capacity for producing a pyogenic reaction may be taken as the lowest common denominator of the pathogenic activities of the hæmolytic streptococci and different as may be the *tout-ensemble* of the diseases they produce there is always to be found this element of pyogenicity. Robert Koch [25] in his great essay on Traumatic Infective Diseases, which inaugurated not only our modern knowledge of septic infection but much of our knowledge of bacteriology as well, describes the local "abscess" which occurs in rabbits when septic material is injected beneath their skin. "Such animals," he says, "have at first no symptoms of disease, a flat lentiform induration at the site of injection being all that is observed. After several days the induration extends in all directions but chiefly downwards and especially towards the abdomen and anterior extremities." If by the modern technique of intradermic injection hæmolytic streptococci are introduced, the series of events described by Koch takes place and there is little need to supplement his description except to add that in many if not in all cases a raised yellow purulent centre develops in the lesion. The histological changes are typical of all pyogenic inflammation even when visible pus is absent. For the purposes of a routine test I have injected 0·2 c.cm. of 16-hour broth cultures of several streptococci on the depilated skin of one rabbit. The reaction produced has been noted at the end of 24 and 48 hours. I have lately examined 71 strains of hæmolytic streptococci from different kinds of acute human disease, scarlet fever, erysipelas, septicæmia and various kinds of suppurations, and a few from apparently normal persons. Without exception all gave a reaction on the rabbit's skin, which I interpreted as pyogenic. Such a direct method of testing the pyogenic activity of bacteria seems to me at least as much value as any in-vitro criterion of "virulence" and is a more consistent test than intravenous injection.

Pyogenic activity is of course characteristic of many bacteria other than the hæmolytic streptococci, being also shown by the staphylococci, *Pseudomonas pyocynaea* and *Bacterium coli*, and it may be noted that these organisms are often hæmolytic as judged by growth on blood plates. The non-hæmolytic streptococci and pneumococci also often have the same power, though in a small series of these that I have examined rabbit reactions are produced with less certainty and seem in general to be less marked than in hæmolytic group. Though perhaps we cannot say that all pyogenic streptococci are hæmolytic, I think we are on safer ground in asserting that all hæmolytic streptococci are pyogenic. If, however, we could assume that the so-called non-hæmolytic streptococci which are pyogenic (including the pneumococci) were in reality endowed with an endocellular hæmolysin—the connexion between hæmolysin and pyogenicity might be brought still more close. Cole [26] has shown that active hæmolytic extracts can be obtained from the bodies of pneumococci by dissolving them in sodium cholate, or by allowing them to autolyse, or by freezing or by drying and grinding, and such may be true of the other non-hæmolytic streptococci that are also pyogenic.

It would certainly be a great simplification of our views on the pathogenicity of the streptococci if we could identify "hæmolysin" with the pyogenic property. A principle which has the characteristic power of hæmolysing the delicate red corpuscles might also, particularly if in suitable concentration, be considered likely to be able to damage or destroy other living cells particularly if in suitable concentration. There are a number of instances illustrating this, the hæmolytic toxin of Welch's bacillus also produces a local necrotic reaction in the skin of a guinea-pig. An immune serum prepared against the red cells of an animal will produce local destruction of tissue when injected into that animal. Saponins which are hæmolytic in very weak dilution cause local necrosis of the skin when used in higher but still moderate concentrations, and the same holds for snake venoms. Perhaps the instance nearest to our present point is that of the newly studied toxin of the staphylococcus. The pyogenic staphylococci also possess a hæmolytic property. Staphylococcal toxin, as Burnet [27] and others have shown, is a hæmolytic toxin in which hæmolytic power and toxicity as measured by the reaction produced in the skin of animals run parallel. This reaction too seems indistinguishable in essential pathology from the pyogenic reactions produced by the living staphylococcus. R. T. Grant and I have recently carried out some experiments on the action of this toxin on human beings. It is admittedly not easy to produce pyogenic reactions by the introduction of sterile materials into living tissue. Those substances which appear most effective for the purpose are powerful protoplasmic poisons and coagulants such as the soluble salts of mercury and silver—such substances as produce and rapidly kill a small mass of cells while leaving the surrounding tissue relatively untouched and reactive. If the toxin of the staphylococcus is pricked into the human skin with a needle, as used by Thomas Lewis in his investigation on the injury reactions of the skin, a small pustule is produced similar in character to that produced by a strong solution of silver nitrate introduced in the same way. Here then we have a toxin which is both hæmolytic and pyogenic though it would, of course, be premature to claim that the living staphylococcus owes its pyogenic properties entirely to this toxin. M'Leod quite clearly recognises the streptococcal hæmolysin as a toxic material, indeed he and Channon [28] use the term "thermo-labile toxin" for it. They even suggest that this toxin in all probability is responsible for the invasive properties of the streptococci and they very properly draw attention to the over-emphasis that has been laid in recent years on the importance of the erythrogenic toxin in the general problem of streptococcal pathogenicity. It should have been abundantly clear by now that it is pyogenicity and invasive capabilities that constitute the most dangerous and consistent weapons of the streptococci, and that erythrogenic toxicity is only a conspicuous though not in itself a very malignant feature in scarlet fever and in stray cases of other forms of streptococcal disease.

If, however, we try to identify the hæmolysin with the pyogenic principle of streptococci by direct experiment we meet with difficulties which so far have not been overcome. This may in part be due to the fact that the streptococcal hæmolysin is one of the most labile of all immunological bodies and is extremely difficult to hold in high concentration sufficiently long for the purposes of animal experiment. Any final preparation of it has relatively low hæmolytic activity and there is reason to suppose that during the growth of streptococci much of it is destroyed as rapidly as it is made. I have recently made many efforts to demonstrate that the hæmolysin of streptococci is also pyogenic, always up to now with a negative or at least equivocal result. What little is known of the toxic properties of the streptococcal hæmolysin has been obtained from a study of its action when

introduced intravenously into animals. Its effect under these conditions is closely similar to that produced by the intravenous injection of any substance *intravenously* into an animal the blood of which it is capable of lysing. If the dose is great rapid death ensues, presumably caused by intravascular hæmolysis, and if the dose is small and repeated, as M'Leod and McNee [29] have shown, anæmia gradually develops. These effects, however, give us no link with natural streptococcal disease unless it is with the signs of intravenous hæmolysis or of anæmia which are occasionally observed in certain severe and rare cases. The intravenous injection of animals with hæmolytic toxin of Welch's bacillus would give us equally little clue to the characteristic effects observed in ordinary gas gangrene which are easy to observe when the toxin is introduced locally into tissues in doses which do not cause a too rapid death of the animal.

If the search for a "pyogenic toxin" has been disappointing, that for a pyogenic antibody has proved equally so. We have tested the neutralising power of sera prepared in many different ways against the pyogenic effects of streptococci in the rabbit's skin. Serum of the ordinary antitoxic type, sera prepared using bacterial bodies, sera from man and animals recovered from acute streptococcal infection have equally failed to influence in a specific way pyogenic reactions in rabbits. A paper has just been published in which Todd [30] claims that he has been able to prepare neutralising serum against streptococcal hæmolysin. It will be interesting to see if the serum has any antipyogenic activity. It may be added, as germane to our general thesis, that Todd finds the hæmolysins of streptococci from diverse sources are antigenically the same.

There are many observations on record purporting to demonstrate that a local immunity exists to the pyogenic action of streptococci.

Cobbett and Melsome [31] state that the cutaneous lesions produced in the rabbit's ear by the injection of erysipelatous streptococci protect the parts directly affected against a subsequent inoculation, but their attempts to prove a general immunity are by no means convincing. Gay and Rhodes [32] obtained somewhat different results, finding that the skin of rabbits remained insusceptible to reinoculation of streptococci for three months or so, irrespective of the position of the original inoculation. In a still more recent study Amoss and Bliss,[33] like Cobbett and Melsome, found that the area previously inoculated acquired a partial resistance to subsequent infection while the rest of the skin remained fully susceptible.

Practically all the authors who have worked in this direction are agreed that any protection observed is temporary and some doubt its specificity. I am very doubtful how far such effects as these are due to specific forms of immunity and my own experiments on somewhat similar lines have never been able to convince me that a specific local immunity exists. The work of Cobbett and Melsome, of Gay and Rhodes, and of Amoss and Bliss as well as that of Birkhaug [34] was done with erysipelas strains and all these authors call the lesions they produced rabbit "erysipelas." This word is perhaps misleading, for some of the peculiar features of human erysipelas are only dimly reflected in the rabbit. Actually these reactions seem essentially the same as those originally described by Koch as following the introduction of septic material into the rabbit's skin and similar reactions may be produced by hæmolytic streptococci from practically any source including scarlet fever if they are introduced at a certain depth into the skin.

INVASIVENESS.

Invasiveness, the power rapidly to pass the local defences and infect the blood, is a property of the hæmolytic streptococci which in the present state of knowledge must be considered separately from pyogenicity, though it may well be closely connected with it. Characteristic though it be, this is perhaps the most variable of all properties of the streptococci, and we have good reason to suppose that it is not even constant in the individual strain. Most laboratory workers have found it a difficult and uncertain matter to exalt the lethality of streptococci by passage through animals. The facts of traumatic septicæmia in man suggest clearly enough that exaltation of lethalty may take place by passage through other human beings; but the exaltation seems of short duration and the streptococcus, so justly dreaded in the post-mortem room, appears to carry little danger in the laboratory where it is often manipulated still more intimately. Nor is virulence as tested by the power to cause fatal blood infection in animals any guide to invasive potentialities in man. The most virulent hæmolytic streptococcus for mice that I have examined killed in intravenous doses of 1/2,000,000 c.cm. Yet it was isolated from a trivial wound of the hand. With a strain isolated from a rapidly fatal case of infection contracted at autopsy, on the other hand, it proved very difficult to kill mice at all. The only experimental method which has been available for studying in the laboratory the invasive effects of streptococci has been by the study of the septicæmic effects of the organisms introduced intravenously, but though the end-result of streptococcal invasion is commonly septicæmia, invasive and septicæmic powers are not the same things and it is perhaps unfair to judge the defences against normal infection by the result of a surprise rear-guard attack. It is not however very easy to devise any other test which gives any information of value.

Anti-invasive immunity.—No subject in the immunology of the streptococci is more difficult than what is usually called "antibacterial" as distinct from antitoxic immunity. We might of course judge antibacterial immunity by a study of local pyogenic reactions, but I have already mentioned that so far only a negative answer has been obtained in this direction. The only available alternative method of study seems to be to determine if any method of immunisation can be devised which can protect such an animal as the mouse from the lethal effect of a parenteral injection of highly virulent streptococci. It is not always easy under these conditions to exclude the contribution of antitoxic immunity. Up to comparatively lately there has been some disagreement whether a specific "antibacterial" immunity to the streptococcus occurs. For example such experimenters as v. Lingelsheim [35] and Pasquale [36] stated they were unable to protect animals against invasion, while Killian,[37] Schloss and Foster,[38] among others, claimed to be more successful. Certainly nothing comparable to the clear-cut protective results of serum in the prevention of pneumococcal mouse infection has been recorded.

The work of Lancefield and Todd [39] has, however, done much to make the situation more clear. These workers have shown that under certain conditions effective immunisation can be obtained against the lethal effects of hæmolytic streptococci introduced intraperitoneally into mice.

They distinguish three kinds of colony variants as regularly occurring among all the hæmolytic streptococci they met with: (1) a matt virulent variety which contains a full complement of type specific protein; (2) a matt variant of attenuated virulence but still with its full complement of "type-specific" protein; and (3) a glossy avirulent variant which has lost most of its "type-specific" protein. In spite of the marked differences of virulence among these

variants all had their full complement of specific carbohydrate and all produced erythrogenic toxin of similar potency. Yet passive protection of mice with serum prepared by immunising with killed bodies of the fully virulent or "matt attenuated" variants was obtained against the homologous strain of streptococcus, though not against hæmolytic streptococci in general. Sera prepared against the avirulent glossy variants did not prove protective. Experiments in which mice were actively immunised against the variants gave the same results.

It should be quite clearly understood that the protection depended not on the species-specific carbohydrate, but on the "type" specific protein, and that the "type" features of any individual strain are at most shared with only a few other strains. Thus nearly every streptococcus would call for an individual "antibacterial" prophylactic and therapeutic serum. It is perhaps possible that this opinion would have to be slightly modified if it were proved that Griffith's four agglutination types corresponded to Lancefield and Todd's type-specificity, but even if this were so it is difficult to envisage how it would affect practical serum therapy.

Some years ago Parish and I [40] noted the rather remarkable effect of the ordinary antitoxin prepared against the erythrogenic toxin of the hæmolytic streptococcus. If rabbits are injected intravenously with a virulent culture of the Dochez streptococcus they nearly always die, usually within two or three days. If, however, they have been previously injected with a sufficient dose of antitoxin they usually survive six days or more. Septicæmia is not prevented, for the streptococci can be grown from the blood of these animals with ease, but it is greatly modified in severity. The antitoxin-treated animals almost always developed subacute joint lesions and tended to die in a cachectic state at a later date. This form of protection was sufficiently consistent to form the basis of a test for antitoxin potency which has since been in extensive routine use. At the time we brought forward evidence which seemed strongly to suggest that the protection thus demonstrated was due to antitoxin itself and not to admixture with any other kind of antibody. We subsequently found that rabbits that die from early septicæmia may have a high level of toxin in their blood and it is not unreasonable to suppose that this is responsible for precipitating early death, at the same time explaining the effects of antitoxic serum. A similar explanation might be invoked for the success of prophylactic serum obtained by such earlier workers as Marmorek,[41] Bulloch,[42] Aronson,[43] and Besredka,[44] in rabbits and mice.

There is really nothing discordant between the observations of Lancefield and Todd and ourselves. The mechanism of the "antisepticæmic" effect of antitoxin is presumably quite different from that of the protective sera described by Lancefield and Todd, and though the action of antitoxin is not fundamental and specific, so far as it strikes at the invasive property of the streptococcus, it has the advantage of being practically applicable, whereas Lancefield and Todd's work clearly shows that "type" specific "antibacterial" sera are not.

It is reasonable then to suppose that no form of streptococcal antibody of prophylactic therapeutic activity of general application has ever been prepared against the hæmolytic streptococci except the antitoxin prepared against their erythrogenic toxin. This has a strictly limited use in therapeutics, and success in its administration will probably depend very much on how far the clinician can assess the contribution of erythrotoxæmia to the clinical features of his case.

Phagocytosis and counter-phagocytosis.—It has been customary in discussing the general defences against pyogenic organisms to lay stress on the importance of cellular defences. It is in the background of many people's minds that pus represents the debris of a fight of a somewhat personal nature between micro-organism and leucocyte. I once heard an eminent pathologist say a propos of this very argument, "The Lord did not put leucocytes into the world for nothing" and there seems little doubt that leucocytes and histiocytes must play some part in the defence of the body against streptococci. What that part may be seems to me to be entirely unexplained by any available knowledge though the work of Gay [45] has done something to give definition to the problem. There is certainly plenty of subject matter for the study of the place of cells and tissues in resistance to infection, one of them being the apparent barrier action of granulation tissue on the extension of infection, an inquiry already initiated by Gay and his colleagues, but there is no immediate promise that such a study is likely to contribute much to the practical prophylaxis and therapy of streptococcal disease.

Gay and Morrison [46] injected virulent streptococci into the pleural cavity of rabbits and observed the subsequent numerical increase of organisms in the exudate and the extension of infection to the blood stream. If the pleural cavity was previously injected with materials as aleuronat, or strong egg white, both of which produce an exudate mainly of polymorphonuclear cells, no significant protection against streptococci resulted. If, on the other hand, meat infusion or dilute egg white were previously injected the exudate consisted mainly of histiocytes and the animals so prepared showed considerable resistance to the local injection of streptococci.

It is, I think, equally impossible to define any specific mode of attack of the streptococci against leucocytes. The term leucocidin has been devised to imply a substance obtained in filtrates from the streptococci which is supposed to have special toxicity for leucocytes. Channon and M'Leod in their careful work on the subject were unable to distinguish hæmolysin from leucocidin, and more recently Alice Evans,[47] though she recognises a leucocidal substance apart from hæmolysin, admits that the action of this substance is in itself small. Under these circumstances it appears to be safe for the moment to consider that if there is any marked action of streptococcal filtrates on leucocytes it may be ascribed to the general cytotoxic properties of the hæmolysin.

The Essential Unity of the Hæmolytic Streptococci.

I have attempted to give in crude outline what I consider to be the more fundamental facts relating to the bacteriology of the hæmolytic streptococci and I would summarise them in the following way.

A large number of hæmolytic streptococci from the most diverse sources in human disease and also from apparently normal persons are essentially similar having the same general morphological and biochemical properties. Agglutination tests, while they show that serological differences exist among members of the group, do not differentiate species within the group.

There are three properties characteristic of the pathogenicity of the hæmolytic streptococci and these must be considered separately.

1. An erythrogenic (or rash producing) toxin, immunologically identical whatever the source from which the strain is derived. To this a neutralising serum is available, under the name of "scarlatinal antitoxin."

2. A pyogenic property, common to all hæmolytic streptococci and perhaps closely related to streptococcal hæmolysin. To this no antibody has so far been discovered.

3. An invasive property which may or may not be linked with the pyogenic property. To this also there is no general antibody available, though Lancefield and Todd's work suggests that antibodies to any particular strain could be prepared.

These three elements in the attack of the hæmolytic streptococcus, pyogenicity, toxigenicity, and invasiveness, vary in intensity from case to case. The strength of the host's defence against erythrotoxin and the site of the conflict also vary. These differences are sufficient to account for the varigated pathological and clinical patterns of human streptococcal disease.

If these views are accepted it must be admitted that the hæmolytic streptococci ordinarily met with in disease, in fact, constitute a species both on grounds of formal taxonomy and of pathology. With regard to the nomenclature of the species, Rosenbach's [48] term *S. pyogenes* has the unquestionable right of priority; hence it should replace Schottmüller's [20] term *S. hæmolyticus* which at present seems to have the greater vogue.

It would be quite unjustifiable to predict that other species of hæmolytic streptococci will not be established in the course of time. For example, the position of the so-called S. "epidemicus" and certain hæmolytic streptococci found in animals has not yet clearly been defined. The anaerobic hæmolytic streptococci have also to be given their proper position. But in the light of our present knowledge there is little doubt that it would save much confusion if bacteriologists would abstain from putting forward new species without good reason, and from what is almost worse—giving pseudo-specific names to what they would never themselves claim were species in any strict biological sense.

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THE GALL-BLADDER AND CARDIAC PAIN.*

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To quote Osler [1]: "The diagnosis of pain is based on the patient's statement; the estimation of the severity is made by observation; the recognition of the cause demands thorough study."

The title of this communication presents a difficulty, for though it is customary and convenient to attribute a particular kind of pain to a particular organ, the anatomical labelling of pain has certain disadvantages in that it may lead us to take up a false position. Having noticed that on occasions disorders of a certain organ are associated with a particular set of painful symptoms, we may acquire the habit of constantly attributing these symptoms to disorder of the organ with which we have previously found them associated.

On these grounds the term "cardiac pain" is open to criticism, but it is difficult to find a better. It is one of those dangerous terms which is dismissed by saying "everyone knows what you mean." "Sternal pain" has a good deal to recommend it, but the objection is that pain of cardiac origin is not always sternal. Also it is desired to include angina pectoris under the heading. Here again are difficulties. Various forms of angina pectoris are described in the text-books. The term "true angina pectoris" is often used, but it is of the same quality as the term "true epilepsy," and may be a convenient cloak for what is not well understood.

Parkinson,[2] in a communication on sternal pain, has said that "sternal pain is not synonymous with angina pectoris, but it can be held to include most of the cases so called. The diagnosis may be completed by deciding what pathological lesion is the cause of the pain. If the use of the term 'sternal' or 'cardiac' pain were more general even at the expense of the term 'angina pectoris' it would result in an earlier, more frequent, and more certain diagnosis of cardio-aortic disease."

Angina pectoris is defined by Douglas Powell [3] as a "sudden paroxysmal disturbance of the heart's function accompanied by severe pain, distressed breathing, and a vague and instant apprehension of death." Allchin [4] describes it as "acute distress in the chest which consists of at least three elements—pain, faintness, and a sense of dying."

On the whole there are fewest objections to the term cardiac pain. The situation of the pain may be sternal, but there may be no pain in the chest. In one of my cases of cardiac infarction there was agonising pain which the patient localised in his left humerus. The pain commonly comes on with effort, but in cardiac infarction the patient is often in bed.

* Based on a communication made to the Association of Physicians of Great Britain and Ireland.

The pain may be slight and dismissed as trifling indigestion, or it may be so severe that the patient is collapsed and may even die during the attack. The term used must be as wide as possible in its meaning. The production of such pain is dependent on many and various factors. With a perfect coronary circulation and a perfect myocardium, there would not be an expectation of pain. There may be organic myocardial change due to syphilitic or other infection, or to degeneration of the coronary arteries. The coronary circulation may be imperfect either from the quality or the quantity of the blood that is circulated. But damage to the myocardium or coronary vessels does not necessarily mean pain. Several factors contribute to the symptoms. Cold air, annoyance, a hastily swallowed meal may be the exciting cause. But sometimes they fail to produce the pain that has occurred on other similar occasions. Further, a certain sensitiveness of the patient has to be considered, and in such circumstances the use of bromides may be regarded as one of the blessings of medicine.

It is a matter of common experience for the cardiac condition of the patient to be improved after the removal of a septic focus such as a dead tooth or a chronic appendix. The general health is improved after the operation, and if cardiac symptoms have been prominent they may become less pronounced or disappear. Several cases of serious disturbance of rhythm have in my experience and that of others been greatly improved after operation on the gall-bladder.

DISORDERS OF THE GALL-BLADDER.

With disorders of the gall-bladder we have several factors that are of special importance that may associate their symptoms with those of the heart. The gall-bladder may be a focus of chronic sepsis; further, it may contain stones, the passage of which is associated with severe pain. There may be some disorder of chemistry which causes widespread defects of circulation. There is the pain of gall-stone colic, one of the most severe of all pains. The heart and the gall-bladder are each capable of producing devastating and demoralising pain. Their innervation is from neighbouring regions of the central nervous system. It would be surprising if the symptoms were always so clear-cut that they could be given their true significance. Many practitioners have had cases which have perplexed them as to whether they were dealing with a cardiac or a gall-bladder disorder.

My own interest in the possible association began many years ago. A doctor came in haste to the hospital to take me to the bedside of an elderly Jewess whom he had been treating for angina pectoris. He said that she was in a bad attack and was dying. The patient was stout, pale, sweating, with a feeble pulse. She was in great pain, and pointed to the left side of the sternum, moving her hand about, and on questioning said she had pain in her arms. A large dose of morphia was given and a bad prognosis. Two months later I was asked by the doctor to admit the same patient to hospital as she was jaundiced and had a large gall-bladder. The gall-bladder was emptied of stones and drained. The attacks of pain ceased. Obviously I considered that I had made a mistake in diagnosis and determined not to be misled again.

Turning once more to the task of discussing cardiac pain, it can be said that the term "cardiac" can be applied to pain, in the origin of which the heart is directly or indirectly concerned, and that it is often impossible to say whether the connexion of the pain with the heart is direct or indirect. There is much to be discovered about cardiac pain. We have in the past been much impressed by the discovery of segmental areas of hyperæsthesia after an attack of cardiac pain but the phenomenon has still much that is obscure in its occurrence.

For instance, a man who had an attack of cardiac infarction was left with the liability to sternal pain on occasions. Usually the pain would come on when he was walking, especially on a cold day or soon after a meal. But after the pain had come on one of two things would happen. Either he would have to stand still until the pain had gone, or he could continue walking and the pain would go. He could never tell at the onset of the pain which he would have to do. The same patient, after having the sternal pain of effort, would have a local erythema of the skin over the area where the pain was felt, a curious phenomenon for which an explanation is lacking.

It cannot be said that there is any one feature of cardiac pain that is constant. Its situation is varied; its severity is of differing degrees; it may render the patient immobile, or he may be restless and even walk about as sometimes happens in cardiac infarction; it may last a few minutes or many hours. The sense of dying is not solely significant of angina pectoris, as the following case shows.

I am indebted to Mr. Robert Milne for the following notes.

A married woman, aged 56, was wakened by severe pain down the left side, arm, and trunk. It was followed by epigastric pain, nausea, flatulence, and diarrhœa. The pain lasted 5–10 minutes. There was the impression of impending death. Arteries, blood pressure, pulse, electrocardiogram were normal. An inflamed gall-bladder was drained and a solitary stone removed. Four years later she reports that she has had no return of pain and is in much better health. Here was the pain in the left arm and the sense of impending death.

Again, a medical man, who had reason to suspect his gall-bladder, was hurrying after a meal when he was seized with a bad attack of angina pectoris. According to his account it was an attack that could not be called by any other name. After the removal of his gall-bladder there has been no return of such symptoms, and he can more than hold his own with men of his age.

The following notes concern a medical man who was engaged in a busy practice.

At the age of 48 he had his gall-bladder emptied of stones and drained. The operation was followed by ten years of comfort. At the age of 58 there was recurrence of niggling pains and flatulence; there was also breathlessness and palpitation. At the age of 59 he was urged by a heart specialist to give up practice on account of "myocarditis," and he did so. At the age of 65 he had pneumonia and was very ill. At the age of 68 he first consulted me. He complained of anginal attacks. He had been seen by his doctor in two. He had lost consciousness in them. He could not go upstairs without pain. He could walk a little, but only on the flat on account of sternal pain. He also had bad attacks of colicky pain in the gall-bladder region with pain going into the right shoulder. In his own opinion he was having cardiac as well as gall-bladder symptoms. The skin was over-sensitive to pin over the right shoulder and the ulnar borders of both arms down to the little fingers. The pulse-rate was 76 per minute, and regular; the blood pressure was 138 systolic and 94 diastolic, and the examination of the heart revealed nothing abnormal.

I advised him to see a surgeon and approved cholecystectomy. The surgeon declined to operate unless he had the approval of a cardiologist. The cardiologist examined him; the electrocardiogram was pronounced to be within the bounds of normal, but on account of the general condition and his post-pneumonic lung the cardiologist advised against operation. The surgeon was approached once more and consented to operate, which he did, and with great skill and success removed the gall-bladder. Now, four years later, the patient is able to walk with comfort and the cardiac pain has gone. He still has some dyspepsia which is kept under control by medical measures.

There are several points about this case. At the age of 59 the heart was under suspicion. He has since gone through pneumonia and a severe abdominal operation. He himself as well as his medical advisers considered that he had cardiac as well as gall-bladder pain. The removal of the gall-bladder has removed his cardiac pain and a

great deal of his physical infirmity. He has left only the symptoms of flatulence. Instead of being a haggard, miserable individual barely enduring an almost intolerable existence, he is bright, happy, and moderately active.

These cases illustrate the connexion between the symptoms which resemble those of a cardiac disorder and a pathological state of the gall-bladder.

A REVIEW OF THE LITERATURE.

The literature on the subject is copious, especially on the other side of the Atlantic. Brockbank [6] has pointed out that cholelithiasis is more common in patients who suffer from chronic heart disease. Mills [6] also, in reviewing the cases at St. George's Hospital, came to a similar conclusion, and Schroeder is quoted as having found the same condition. But this is not the condition with which I am here concerned.

Dr. de Havilland Hall [7] at the Medical Society of London described the case of a man between 50 and 60 years who suffered from excruciating pain in the region of the heart with much depression and faintness. Nitrites did not relieve but blue pill and mist. alba were beneficial. The condition was diagnosed as angina pectoris by himself and another physician. The pain continued for three to four months. Later there was an attack of gall-stone colic followed by a hepatico-bronchial fistula. The angina pectoris ceased.

Sir R. Douglas Powell [3] described one case in which hepatic colic was complicated with a fatal attack of angina pectoris, which it apparently excited; and another case of distinct hepatic colic with the passing of biliary grit, and at other times cardiac pain of an anginal kind with faintness and oppression.

Sir James Mackenzie [8] called attention to the fact that John Hunter was found to have gall-stones as well as degenerate coronary arteries; and has expressed his opinion that Hunter's earlier symptoms were biliary and not cardiac. He also described a case of angina pectoris which was improved by diet and cured by cholecystectomy.

In his remarks about biliary colic Osler [1] says: "Palpitation and distress about the heart may be present, and occasionally a mitral murmur occurs during the paroxysm, but the cardiac conditions described as coming on acutely in biliary colic are due to persistent myocardial degeneration not infrequent in patients with gall-stones."

Rolleston [9] has written that "the absorption of toxin from inflamed gall-bladder may cause myocarditis, angina attacks, and cardiac failure," and "angina and anginoid symptoms in patients with gall-bladder disease may be due to the exhaustion of a poisoned myocardium," and "the pain of biliary colic sometimes resembles angina."

The possible connexion between cardiac and biliary disorders has not escaped the notice of surgeons. Moynihan has used the phrase "cholecystitic heart." He refers to the irritability of the heart in such patients. Fint [10] attributes the irritability to the increase of circulating bile-salts.

It has happened to many physicians to decide that acute symptoms of the upper abdomen were due to cardiac infarction, and to stay the hand of the surgeon. In these cases acute disorder of the gall-bladder may be simulated. In America the subject has produced extensive literature. C. B. Leech [11] examined 116 proven cases of gall-bladder disease, exclusive of malignancy, before and after operation. His general conclusions were that there is no definite relationship between gall-bladder disease and disease of the cardiovascular system, and that the risk of operating on patients with gall-bladder disease and organic cardiac disorders was no greater than for other similar operations. On the other hand, R. H. Babcock [12] regards chronic cholecystitis as a cause of myocardial incompetence, and reports that improvement in the cardiac condition has followed operation.

S. A. Roberts,[13] writing on the diagnostic relations between the gall-bladder and the heart, concludes that (1) the patient with a diseased gall-bladder previous to any symptoms characteristic of cholecystitis with or without a cholelithiasis, may present symptoms of early heart failure or angina pectoris, or both; (2) in middle and old age heart failure or angina pectoris may be produced or accentuated by a diseased gall-bladder; (3) in both conditions the gall-bladder may be the cause, but all the signs and symptoms may appear cardiovascular in nature; (4) it is suggested that cholecystography may help to differentiate; (5) such patients should not be deprived of the benefits of surgery.

Graham,[14] quoted by Roberts, has written: "We have observed brilliant results in cases of heart disease followed by cholecystectomy after it had been determined that there was a pathological gall-bladder." Many others, including Lichty,[15] Willius and Brown,[16] have written and expressed similar views.

More recently Schwartz and Herman [17] have contributed a study of 109 cases of gall-bladder disease. Their investigation shows that 63·3 per cent. of cases had associated myocardial disease, and that the majority were obese; an infected gall-bladder and obesity are equally responsible for the myocardial damage of patients with chronic cholecystitis. Severe and mild cholecystitis, judged by clinical standards, have the same effect on the heart. Burns [18] in Canada also has called attention to the frequency with which cardiac symptoms simulate abdominal conditions.

It is clear that on the continent of North America the subject has attracted the attention of many observers, and that among those quoted, with one exception, the opinion is that there is some connexion between cardiovascular disorder and non-malignant disease of the gall-bladder.

CLINICAL ASPECTS.

Reference has already been made to four patients, two of whom were doctors, whose symptoms were those of angina. In all of them operation has been followed by relief of cardiac symptoms. Many other cases could be quoted from my own records, and still more from the records of other observers.

The difficulties of distinguishing between the symptoms of cardiac infarction and those of an acute gall-bladder have been mentioned, but the difficulty is increased by the fact that the same patient may be afflicted with both conditions. I am indebted to Dr. J. Parkinson and Dr. J. Fawcett for the notes of the following case.

Mr. A, in 1925, at the age of 61, had an attack in the night of mid-sternal pain which extended down both arms. One month later he was found to have a blood pressure of 170/100; the arteries were thickened and the aorta somewhat prominent on radioscopy. Wassermann reaction was negative. The electrocardiogram was deeply inverted in lead I., and during the next few months this became less pronounced. In 1927 he had some abdominal pain and tenderness for six months. In December, 1930, he had a severe attack of gnawing, sickening pain which took five minutes to reach its height and gradually became easier. A week later the pain returned, with vomiting. There was great abdominal tenderness in right costal margin and epigastrium. The next day there was a trace of bile in the urine as well as some albumin and sugar.

The diagnosis was made of gall-stones, cholecystitis, and pancreatitis. He declined operation at the time. He had several minor attacks, and a worse one in February, 1931. Four days later Mr. R. P. Rowlands operated. The conditions diagnosed were found, and fat necroses were present. He made a good recovery, and four months later reported that he was much better in all ways.

Dr. J. A. Ryle has kindly furnished me the following notes of four of his cases.

Mr. B, aged 58, a hard-working business man who had lived well and smoked heavily had for three years complained of retrosternal pain on cycling and walking fast. After being retired from his firm he began to have frequent anginal attacks, some of which lasted an hour. They were relieved by heroin but not by amyl nitrite. The pain was "gripping," and felt over the sternum and præcordium, and down the left arm. There was neither pyrexia nor pulse disturbance. Earlier in the year the blood pressure had been 190 systolic. Before the recent attacks it had been 160, and now it was 130. There was a trace of albumin in the urine. A coronary occlusion was suspected, and prolonged rest advised. Two days later he had a stomach-ache and was sick. The next day he was distended, and the day after he was operated on for an empyema of the gall-bladder by Mr. Cecil Rowntree. The latest report is that he has had uninterrupted good health since convalescence, and he is no more "puffy" than would be expected in a man who is badly out of training.

Mr. C, aged 67, had been treated satisfactorily for obesity, glycosuria, and myocardial symptoms. On Jan. 1st, 1931, he had an attack of severe epigastric pain and sickness, followed by pyrexia and rigidity of the right upper quadrant. No definite jaundice. There was a leucocyte count of 18,750. Acute cholecystitis was diagnosed, and as the symptoms were abating and the patient was not a good subject, operation was not advised. Four days later he was seized with severe anginal pain radiating down the left arm, which lasted a long time. The attack left him exhausted and frightened. The pulse remained slow and regular 60 to the minute. No pericardial friction, BP 105/90, a slight rise in temperature. Coronary thrombosis was suspected. During the next 12 months he had several attacks, and one was accompanied by anginal symptoms. Another was very severe, and was followed by rather intense jaundice but no anginal symptoms. Since then he has been wonderfully well.

Mr. D, aged 69, had had an attack of abdominal pain with jaundice seven years before. Two years later he began to have anginal attacks, the pain being to the right of the sternum and radiating into the right side of the neck and jaw. The blood pressure was 170/120. From this time he could not walk faster than two miles an hour without inducing pain. He had two attacks of biliary colic with pyrexia, a palpable gall-bladder, and a leucocyte count of 12,300. The gall-bladder did not fill with the dye and the electrocardiogram was normal. A large thickened gall-bladder containing stones was removed. Six days later he had a typical attack of coronary thrombosis with sternal pain radiating to the left side of jaw, neck, and shoulder. There was slight pyrexia, pericardial friction, and three days later a small pulmonary infarct. He made a satisfactory but slow recovery but has remained incapable of effort.

Miss E, aged 46, a hard-working energetic woman, had in 1927 a typical attack of coronary thrombosis with pain referred to the left suprascapular region, with a pulse of 120 and a temperature of 100·4°, and the next day a pericardial friction. Later the electrocardiogram confirmed. At this time and frequently since there has been tenderness in the gall-bladder region, and occasionally there has been spontaneous pain there. She has frequently been better after courses of urotropine. The blood pressure has never been raised, and there is no evidence of arterio-sclerosis.

The following notes are those of a patient whom I saw recently with Dr. A. Clark-Kennedy and Dr. D. Henning Belfrage.

Miss B. K., aged 64, was seen by Dr. Belfrage in a typical attack of angina; later she was jaundiced. Recently she has had pain in the chest and throat chiefly on walking. She was now able to walk only a few yards and very slowly. She has also had several attacks resembling gall-stone colic. She had been radiographed by Dr. Cecil Bull, and the gall-bladder was shown to be thickened and containing stones. An electrocardiogram had been done which showed a left-sided preponderance and inversion of T-wave in lead II. She was operated on by Mr. Claude Frankau, who removed a thickened gall-bladder containing stones. Two months after the operation she is reported to be in excellent health and able to walk uphill and upstairs without pain, and is very busy getting into a new house and moving furniture about.

These cases illustrate sufficiently well that it is possible for the two conditions to occur in the same subject. It is also significant that in these cases and in those quoted earlier the gall-bladder may be closely concerned with the production of cardiac pain.

It has to be remembered that the two conditions occur at the same time of life; that the indigestion of the gall-bladder patient has flatulence for its most constant symptom; that gastric flatulence is a serious trouble to the cardiac patient; and that cardiac symptoms are commonly relieved by the eructation of gastric flatus, and that the treatment of cardiac patients is often dietetic with the object of reducing weight and flatulence. On the other hand, cardiovascular disorders are said to be commoner in males, and gall-stones and cholecystitis in females. But women suffer considerably from cardiac defects and symptoms. Their cardiac pain is called "pseudo-angina," and "wind round the heart" if it is not severe. But women also suffer from cardio-vascular degeneration, and they suffer to a greater degree than men from cardiac adiposity. It would appear then that disorders of the two organs may be present in the same individual, and that the symptoms can be confused.

MORBID ANATOMY.

Through the kindness of Prof. H. M. Turnbull I have had the opportunity of examining the post-mortem records of the London Hospital for ten years. In all 350 cases of non-malignant disease of the gall-bladder—i.e., cholecystitis and/or gall-stones—were discovered, 202 females and 148 males.

The details of the condition of the arteries and myocardium were noted and compared with those of patients of the same age-groups whose gall-bladders were normal (Table I.). A comparison was

TABLE I.—*Comparison of Degrees of Atheroma by Marking.*

Age.	Males.				Females.			
	G.-B. cases.		Non-G.-B. cases.		G.-B. cases.		Non-G.-B. cases.	
	No.	Av.	No.	Av.	No.	Av.	No.	Av.
21–30	None		None		4	2·00	26	2·46
31–40	7	4·57	48	2·87	3	2·66	48	2·41
41–50	14	4·28	133	4·37	38	4·36	108	3·50
51–60	55	6·14	176	4·65	69	5·79	214	4·59
61–70	47	7·70	133	4·99	60	6·50	110	5·81
71 and over	25	7·68	60	7·70	28	7·85	31	7·03
Total	148		550		202		537	

G.-B. = gall-bladder.

The method of marking was to give 2 marks for "slight."
" " " 4 " " "moderate."
" " " 6 " " "considerable."
" " " 8 " " "severe."
" " " 10 " " "very severe."

The above table is shown for interest. It is not meant to have statistical value.

possible, as the descriptive terms employed by Dr. W. W. Woods and Dr. A. B. Bratton are strictly used. Only certain words are employed, slight, moderate, considerable, severe, and very severe. Though two cases described in the same terms may not have been exactly identical, the variation was so slight that it could be disregarded. Over a thousand cases were taken for comparison, and as nearly as possible three were taken to compare with each gall-bladder subject in the different age-groups. But no

system of recording morbid processes is capable of exact measurement, and no claim is made here that it is. On the other hand, care has been taken to put a correct value on terms that have been as far as possible used with uniform exactness. The first comparison was made of those cases in which the degree of atheroma was described as "severe" or "very severe" (Table II.). It will be seen that in

TABLE II.—*Severe and Very Severe Atheroma.*

Age.	G.-B. cases.	Non-G.-B. cases.
MALES.		
21–40	No cases.	No cases.
41–50	3 out of 14 = 21·4 %	7 out of 133 = 5·2 %
51–60	22 out of 54 = 40·7 %	14 out of 176 = 8·0 %
61–70	29 out of 49 = 59·1 %	24 out of 142 = 16·9 %
71 and over..	13 out of 19 = 68·4 %	30 out of 53 = 56·1 %
FEMALES.		
21–40	No cases.	No cases.
41–50	3 out of 38 = 7·8 %	3 out of 108 = 2·7 %
51–60	14 out of 69 = 20·2 %	17 out of 214 = 7·9 %
61–70	25 out of 60 = 41·6 %	28 out of 110 = 25·5 %
71 and over ..	18 out of 28 = 64·2 %	17 out of 23 = 73·9 %

both males and females the differences in the two groups for the age of 71 years and upwards are not significant, there being little difference. Below this age there are differences to be noted. Among males between the ages of 41 and 70 there are many more cases of severe atheroma among the gall-bladder cases than among non-gall-bladder cases. Among females the difference is not so great, but still a definite majority.

The figures were submitted to Prof. Major Greenwood, F.R.S., who very kindly examined them and reported as follows:—

"We have gone into the statistics of these data, taking the two tables where the classification is 'severe' and 'very severe' as our basis, and have asked ourselves whether the differences are statistically significant. In plain English, are the odds against the excess percentage of atheroma in the gall-bladder group being a mere freak of chance so great that it is unreasonable to think that chance is the explanation? With regard to the age-groups 51–60 and 61–70, the answer is that for both males and females the difference is far greater than any which can reasonably be attributed to play of chance. In the age-group 41–60 for females, the difference is not so large that a chance variation can be ruled out; in the age-group 41–50 for males, however, the difference is too great to be reasonably explained by chance. In the age-group 71 and onwards, the differences both for males and females are not significant. When the two distributions are considered as wholes, neither of them is consistent with a mere chance difference. It seems to me, therefore, clear that it is established on this sample that the frequency of severe atheroma as defined is greater in the gall-bladder cases."

Other comparisons were made. An attempt was made to give a numerical value to the different degrees of atheroma. It is not claimed that such a method is satisfactory, nor is it strictly applicable to morbid processes. At the same time it is interesting to note that in the gall-bladder cases the degree of atheroma is greater than in the others. Also that in the age-group 71 and upwards in both males and females the figures tend to approximate, and that the difference at other ages is greater in males than in females. Coronary thrombosis was apparently commoner in the gall-bladder cases, especially in males between 51 and 70. Thus in 102 male gall-bladder cases between 51 and 70 there were eight cases of recent cardiac infarction, whereas in the non-gall-bladder group there were three cases out of 133. Also in these 102 gall-bladder cases areas of myocardial fibrosis were noted in 13. These figures are interesting, though they are obviously of no statistical value. Among females the total figures for coronary thrombosis are still smaller, but even so the gall-bladder cases have a majority.

Without claiming too much, it can be accepted that among patients who have diseases of the gall-bladder of a non-malignant nature, the frequency of severe arterial degeneration is greater than in those who are free from gall-bladder disease, and that the degree of arterial degeneration can be expected to be higher among gall-bladder cases.

COMMENT.

An attempt has been made to discover any factor which might have a bearing on the relation of the gall-bladder to cardiac pain. Clinically, symptoms attributed to disorders of both organs are not uncommonly found in the same patient; also several patients of my own and other observers have been relieved from cardiac pain after operation on the gall-bladder. Is it possible for a diseased gall-bladder to produce symptoms that would be agreed to be cardiac? This question cannot be answered dogmatically, but it is possible that disease of the gall-bladder can produce the same shock and symptoms similar in type, localisation, and severity as disease of the heart. But if cardiovascular degeneration in gall-bladder disease is in advance of its years, it is possible for the heart to add its particular symptoms to those that afflict the patient. It may be that the presence of a diseased gall-bladder is in itself sufficient to cause a middle-aged heart to produce unpleasant cardiac symptoms. Cases occur in which the symptoms are cardiac, and later a gall-bladder attack supervenes which calls for operation. After the operation the cardiac symptoms disappear. We cannot be certain, we can only speculate about such cases. But it can be said that if in a patient with cardiac pain there is any justification for condemning the gall-bladder, surgical treatment should be advised. Many patients are refused operation on account of the cardiac symptoms. I believe this attitude is wrong. The operation is a severe one, but in my limited experience the results have been good, and in some cases remarkable. In America Leech found that the risk of a gall-bladder operation was no greater than for other operations in patients of the same age. Roberts also is definite in his statement that "such patients should not be deprived of the benefit of surgery." In my own experience I have seen no reason to regard the risk as being great enough to forbid operation.

SUMMARY.

1. Clinically there may be considerable resemblance between the severe pain of the gall-bladder and cardiac pain, and there may be overlapping of symptoms in severe attacks affecting either organ. 2. Both types of pain can occur in the same subject and be recognisable as distinct. 3. Disorders of both organs may be present in the same patient. 4. Cases have been quoted in which surgical treatment of the gall-bladder has been followed by relief from both types of pain. 5. If there is any reason to suspect the gall-bladder in any patient who has cardiac pain a full investigation of the gall-bladder should be made, and if sufficient evidence is found, operation should be advised. 6. A study of morbid anatomy reveals the fact that in subjects with diseased gall-bladder the degree of arterial degeneration was higher and the cases of severe arterial degeneration were more numerous than in those whose gall-bladders were healthy. 7. That being so, it would appear to be rational to deal thoroughly with cases of cholecystitis or gall-stones as soon as diagnosed.

I desire to express my gratitude for allowing me to use their clinical notes to those physicians and surgeons whom

I have already mentioned. For allowing me to examine the records of the London Hospital Pathological Institute I am deeply indebted to Prof. H. M. Turnbull and to Dr. A. B. Bratton, and Dr. W. W. Woods for their help in the investigation. I wish to express my thanks also to Prof. Major Greenwood for his kindness in examining the figures and in giving the opinion which I have quoted.

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INTRAVASCULAR OCCLUSION OF THE MESENTERIC VESSELS.

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Intravascular occlusion of the mesenteric vessels is a catastrophe which is attended by an extremely high mortality-rate but is apparently not so rare as was formerly supposed, and should always be kept in mind in an acute case showing signs of intestinal obstruction. Five cases have occurred at the Queen's Hospital, Birmingham, during the last seven years, and I was permitted by the surgeon in charge to operate upon Cases 4 and 5. This short series illustrates certain points about the symptoms which seem to be adequately explained by consideration of the pathology.

Briefly, mesenteric vascular occlusion may be classified in the following way (Larson [1]): (*a*) arterial; (*b*) venous; (*c*) mixed arterial and venous—this variety is secondary to strangulation and will not be further considered.

(*a*) The *arterial cases* may be due either to an embolus, when the causative factor—a cardiac mural thrombus or valvular vegetation—is present, or to thrombosis of the vessel, when arterio-sclerosis or a generalised arteritis from sepsis is found. In this division may be included a group of cases which are labelled "intermittent mesenteric claudication" by Larson. This is a group which gives rise to much speculation. From time to time surgeons are confronted with puzzling cases where the signs and symptoms of subacute intestinal obstruction are present but on laparotomy nothing obvious is found and recovery takes place. Klein [2] quotes nine cases which he diagnosed as early mesenteric thrombosis and which recovered after expectant treatment, and it is possible that some of the obscure cases with intestinal obstructive symptoms that are met with from time to time are due to spasm of the mesenteric arteries. In this connexion Finney [3] records a case of his own where a girl of 20, known to be suffering from Raynaud's disease, was seen by him with the symptoms of a subacute intestinal obstruction in which he jokingly made a diagnosis of spasm of the superior mesenteric artery. At operation a length of blackened gut was discovered at the lower end of the ileum; three feet were resected, and the patient made an uninterrupted recovery.

(*b*) The *venous types* are divided again into ascending, where foci of sepsis are present in the pelvis or lower abdomen—such as a suppurating appendix or an infected ovarian cyst—and descending, where liver conditions, such as cirrhosis or infection, are present. An important division of the ascending cases is those cases of thrombosis of the splenic vein where splenic disease is present.

CLINICAL PICTURE.

From a consideration of the production of intestinal obstruction in the various groups, it seems evident that the mode of onset and the initial symptoms will vary. For instance, a case of embolism from a cardiac vegetation would be expected to show a history of an acute sudden onset and a rapid supervention of gangrene with symptoms of obstruction; whereas the arterio-sclerotic type might reasonably be expected to have preliminary symptoms and to run a less fulminating course. Similarly, in the venous types, a thrombosis starting in the radicles of the portal system, or a gradual occlusion of the ramifications of the portal vein in the liver spreading back to the portal vein itself, would give rise to some preliminary subacute symptoms before the onset of gangrene brought on a condition of complete intestinal obstruction.

A point brought out in the cases quoted below which seems to be of some diagnostic value is the frequency with which the onset of pain is situated in the right iliac fossa. I can find no mention of this in the literature, although it seems to be a reasonable thesis that thrombosis would be most likely to start in the furthest branches of the portal system, which, in the case of the superior mesenteric vessels at any rate, would be in the region of the ileocæcal junction. As regards the inferior mesenteric artery the rarity of the condition in these vessels may be explained by the fact that their most distal branches, the superior hæmorrhoidals, enter into communication with the systemic circulation via the middle and inferior hæmorrhoidal vessels, and also because arterial embolism is less likely to occur in the inferior mesenteric artery owing to the fact that this leaves the aorta at more of an angle and at a lower level than the superior mesenteric artery.

In the series of cases mentioned below there is no instance of occlusion from an embolus, and in no case could the onset of the illness be considered sudden or the course fulminating. The embolic cases are, of course, the most favourable, or rather, least unfavourable for operative cure, for any resection carried out on thrombotic cases is likely to be followed by a spread of the thrombosis along the vascular tree.

The late picture in this condition is the same in all types, being that of an intestinal obstruction; characteristic features are the passage per rectum, of a dark fluid consisting almost entirely of blood, occasionally a blood-stained vomit, a marked fall in temperature, and a raging thirst.

The relative frequency of the various types of mesenteric vascular occlusion differs markedly in the various series of cases published. Larson [1] in his review of 36 cases found the following percentages: arterial 39, venous 44, mixed 17; the average age of his cases was 52·2. Ross [4] found in five cases that the arterial were twice as common as the venous types. In my series a marked preponderance of the

venous over the arterial varieties is found, only one (Case 3) being under the latter heading. The average age of my cases is 57, three being females and two males.

CASE RECORDS.

The following is an account of the cases:—

CASE 1.—A female, aged 59, was admitted on June 7th, 1924, with a temperature of 99° and a pulse-rate of 102. There had been a gradual onset of dull aching pain in the right iliac fossa 24 hours previously. This had not been very severe but had gradually become generalised over the whole abdomen. There was a watery vomit soon after admission. Her bowels had been opened slightly on the previous day. An examination revealed a tender mass in the right iliac fossa, and an operation was advised. When the abdomen was opened four feet of blackened ileum were resected and an anastomosis performed. The patient died seven hours later. Post-mortem examination revealed an extension of the gangrene of the gut, which was found to be due to a thrombosis of the portal system spreading distally from the liver, which was very soft, pale, and homogeneous in appearance. No other cause could be found for the thrombosis.

The thrombosis was venous and descending in this case. The symptoms were gradual in onset and began definitely in the right iliac fossa.

CASE 2.—A female, aged 66, was admitted on Jan. 18th, 1925, with a temperature of 98° and a pulse-rate of 86. Seven days before she had complained of a feeling of constriction around the upper abdomen and said she noticed a swelling of the upper left part of her abdomen. She had experienced increasing difficulty in getting her bowels open and had been completely constipated for the previous two days. She was tender all over the abdomen on examination, especially over the lower half. Two enemas were given after admission; both were successful but contained altered blood. A laparotomy was performed the following day. Nothing abnormal was discovered except a blueness of the lower ileum. No resection was performed, the abdomen was closed, and the patient died a day later. At autopsy a thrombosis of the entire portal system was discovered, the blueness of the intestines having extended, and become, in the region of the lower ileum, a definite greenish-black colour. The cause of this was found to be a universal portal thrombosis. Death, however, had been immediately caused by a left pulmonary embolus which had presumably originated in a thrombosis of the femoral vessels which was discovered.

This was a case of venous thrombosis, and is of interest in that the femoral thrombosis and pulmonary embolism point to a diseased state of the vascular system in general, manifesting itself in two different situations. The lengthy duration of symptoms—one week—is a notable feature.

CASE 3.—A male, aged 63, was admitted on Nov. 14th, 1929, with a temperature of 100° and a pulse-rate of 120. The patient complained of pain in the abdomen during the previous fortnight. The pain was dull and aching and was situated in the right iliac fossa. He had also suffered during that time from cramp-like pains in the hands and legs. He had been unable to get his bowels open for the last four days, and on examination was found to be generally distended and tender in the right iliac fossa. No lump could be felt. At operation on the following day, a length of gangrenous small intestine was found and resected, the peritoneal cavity being full of blood-stained fluid. An anastomosis was performed but the patient died the following day. Post-mortem examination revealed a thrombosis of the superior mesenteric artery.

This was a case of occlusion from arterial thrombosis, and the long history and gradual onset of obstruction are strikingly at variance with the picture portrayed by leading text-books. The cramp-like pains in the hands and feet may possibly have been due to an obliterating thrombo-angiitis of his limb vessels, pointing to a general failure of his arterial system.

CASE 4.—A female, aged 48, was admitted on April 27th, 1931. This patient had been seen in the out-patient department a week previously complaining of vague abdominal pain with some tenderness in the right iliac fossa. An X ray examination of the alimentary tract was made, but no abnormality was discovered. On admission, the pain in the right iliac fossa had become a little more marked and she had a temperature of 100·2° and a pulse-rate of 100. The tenderness in the right iliac fossa was still present on examination but not so marked, and very little rigidity was found. A suggestion of acute appendicitis was made, and on the directions of the surgeon in charge of the case I operated upon her the same evening. On opening the peritoneal cavity a quantity of thin serous fluid escaped. The cæcum and terminal ileum were a little dilated and a slight blueness of the gut was noted. The intestines were carefully searched for signs of obstruction; I noticed hard masses in the colon, which were taken to be concretions of fæces and barium. In the absence of any other evidence, this was assumed to be the cause of a subacute obstruction leading to the serous effusion and the slight dilatation of the gut that was present. A fibrosed adherent appendix was removed, but did not show any signs of recent inflammation. The abdomen was closed without drainage, but the following day the patient complained of pain in the lower abdomen, where she was tender and, peritonitis being diagnosed, a suprapubic incision was made under local anæsthesia. A quantity of blood-stained fluid escaped. A drainage-tube was inserted, but the woman died a few hours later. At post-mortem examination six feet of gangrenous ileum were found. The radicles of the portal vein draining the appendix and the gangrenous gut were thrombosed, the thrombosis extending up to the hilum of the liver. The spleen was enlarged to twice its normal size and its vein was thrombosed. The mesenteric arteries and the heart itself were normal.

This case comes under the heading of venous occlusion of the ascending type. Tenderness in the right iliac fossa coupled with the rise in temperature and pulse-rate pointed, I thought, to appendical disease. The slightness of the rigidity and the obstructive symptoms present were thought to be explained by the fact that the patient was past middle age, at which time it is recognised that appendicitis may present an atypical picture.[4] The length of the history is again a marked feature.

CASE 5.—A male, aged 49, was admitted on June 4th, 1931, with a temperature of 97·8° and a pulse-rate of 88. This patient walked up to hospital with a note from his doctor, who had diagnosed a subacute appendicitis. He had begun to have pain in his right iliac fossa four days previously, which had now become generalised. He had vomited once or twice during the last two days and had only had his bowels open once—the day following the onset of his pain. His history revealed the fact that he had had a thrombosis of the left leg eight years before. On examination, he was found to be tender all over his abdomen, and some central distension was observed. An operation was performed soon after admission, and large coils of blackened gut presented through a paramedian incision. Four feet of small intestine were resected but the proximal part of the gut almost up to the duodeno-jejunal flexure showed some blueness. A Paul's tube was tied into each end and the intestines drained into a Winchester by the side of the bed. Warmed normal saline was injected at four-hourly intervals into the lower tube, the patient seeming to stand the operation well and to be fairly comfortable the next morning. The following day he rapidly sank, bloody fluid drained from the upper tube, and he died 48 hours after operation. Post-mortem examination revealed an extension of the portal thrombosis right up as far as the portal fissure and a remarkably extensive blackening of the gut. The liver showed advanced multilobular cirrhosis with superadded acute fatty degenerative change and necrosis. The whole of the portal system showed a remarkable condition of diffuse thrombosis causing a gangrenous change in the whole of the small bowel. The splenic vein was also thrombosed and the spleen greatly congested. The heart showed moderate general myocardial sclerosis with coronary atheromatous degeneration. No valvular disease was present.

This must be regarded as a venous case originating in the diseased condition of the liver. Apart from the absence of valvular vegetation or mural thrombosis in the heart, the length of the history and the subacute nature of his illness indicate this, though doubtless his damaged myocardium was an additional factor in its onset. The extensive length of gut affected is explained by a process of thrombosis starting in the liver and spreading peripherally, the most remote parts—i.e., the lower ileum—being most obviously affected.

I thank the surgical staff of the Queen's Hospital for permission to record the above cases, and in

particular Mr. Hugh Donovan, who suggested this article and gave me the benefit of his advice.

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AMBLYOPIA:
THE EFFECTS OF KINETIC TREATMENT.

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IN the routine examination and treatment of eyestrain patients in my practice, according to the principles laid down in my previous publication,[1] I have been struck of late by the frequent improvement in vision without correction by glasses. I reviewed, therefore, the first 200 records of these cases and the result is that in 51 of them I found an improvement of vision averaging the remarkable figure of 50 per cent.

Amblyopia has been defined as follows:

"Amblyopia (ἀμβλύς, blunt) and Amaurosis (ἀμαυρός, dark) are terms used for partial and complete loss of sight respectively in one or both eyes. They are not used of all cases of partial or complete blindness, but have become restricted to certain forms of more or less indefinite character devoid of ophthalmoscopic or other marked objective signs." [2]

The partial loss of sight in otherwise healthy eyes—i.e., the amblyopia of the above definition—is common, far more common than may have been realised by the profesion, if, as should be done, one includes all those cases which show partial loss of sight unwarranted by the amount of refractive error present. These amblyopias, upon coming to diagnoses, are concealed—some may call it "cured"—by the correction of the refractive error found, but the actual condition, nevertheless, persists, and the moment the correcting glasses are removed the amblyopia becomes manifest. And, moreover, even with full correction of the error, one or both eyes may show a definitely diminished visual ability compared with what they ought to have if the amblyopia were removed by more suitable treatment.

Cantonnet and Filliozat, in their recent outstanding work on strabismus,[3] have shown why in very many cases it is an advantage for binocular vision that one eye should see detail less distinctly than the other, and they call this "neutralization." In order to forestall any possible confusion it should be pointed out, however, that the subject of this paper is not neutralization but amblyopia. Amblyopia connotes a partial loss—not suppression—of sight, which manifests itself whether the other eye be looking or not. A few instances may make this clear:

CASE 1.—A, aged 18, had a vision 11/20 in the right eye, and 5·5/20 in the left; the refraction was emmetropia in the right and ¼ dioptre of myopia in the left. As there was eyestrain and weakness of involuntary convergence (astheno-vergence), this patient received 17 daily sittings of kinetic treatment. The result was a cure of the astheno-vergence and consequent disappearance of eyestrain, but, incidentally, the vision, without glasses, of the right eye had increased from 11/20 to 25/20 and that of the left eye from 5·5/20 to 11/20. With correction of the ¼ dioptre myopia the vision of the left eye was 25/20.

Here, evidently, was amblyopia—i.e., "partial loss of sight devoid of ophthalmoscopic or other marked objective signs"—not warranted by the condition of the refraction. Until the diagnosis of astheno-vergence and the subsequent result of kinetic treatment had made the position clear, the amblyopia had been compensated by a correction with weak negative glasses (−0·75 sph.) which had "cured" the loss of sight, giving a vision of 18/20 with each eye and of 25/20 with both together. From a visual point of view, provided the spectacles prescribed were worn, the prescribing doctor and the patient could have been content, but the patient objected to the wearing of glasses. As can be seen above, no glasses are now necessary.

CASE 2.—B, aged 21. Vision right eye 5·5/20 with −2 sph. −0·25 cyl. 25/20. Vision left eye 1·5/20 with −1·5 sph. −0·75 cyl. 25/20. Eyestrain was complained of and was cured by 21 daily sittings of kinetic treatment for astheno-vergence. The vision of the left eye improved from 1·5/20 to 5·5/20.

The vision of the right eye was justifiable by its condition of refraction, consequently this was not amblyopia, but the vision of the left eye (1·5/20) was not warranted by its refraction. As this patient also objected to the wearing of glasses, the enormous benefit to her of the increased visual acuity is evident.

CASE 3.—C, aged 28, refraction hypermetropic 0·75 in either eye. Vision of right eye 17/20, left eye 22/20. After 26 daily sittings of kinetic treatment for astheno-vergence the visions were 25/20 in each eye, without glasses.

These three cases may suffice to illustrate the point under consideration. They are, I think, evidence that we have to do with "amblyopia." This evidence is, moreover, accentuated by the experience that the defect is readily cured by kinetic treatment for astheno-vergence, showing that this loss of sight is not inherent in the condition of refraction but is caused by astheno-vergence, and is curable, therefore, without and apart from correction of refraction.

The importance of the observation that weakness of involuntary convergence (astheno-vergence) is causative of some serious defect of vision may be gathered from the fact that this kind of defect, this amblyopia, is of very frequent occurrence. As already stated, I have found it in 51 of the first 200 cases treated by me on the indications of eyestrain caused by astheno-vergence. The frequency seems to indicate that a considerable percentage of civilised humanity is suffering from amblyopia in one or in both eyes, a defect which can be radically cured by appropriate treatment of its cause, in contradistinction to the spurious cure by correcting lenses. That this partial loss of sight can be, and in many cases is, overcome by the wearing of suitable spectacles is certainly a consolation and diminishes the seriousness of the condition. Nevertheless, the condition remains.

I give here, in Tables I. and II., the figures of the 51 cases referred to—viz., 38, where at the beginning and at the end of the treatment both eyes had been tested separately as to vision without glasses, and 13 other cases where only at the end of the treatment the vision of both eyes together had been tested without glasses. The omission to test the vision of each eye separately was caused by the fact that at the time I was not aware of the importance of the repetition of these separate tests after the kinetic treatment. I was wrong in thinking that only binocular sight had greatly improved by the treatment.

The figures mentioned signify so many one-twentieths of reading of Snellen's letters at distance, according to the universally used standard.

When the averages are taken, it will be seen that the right eye's vision has improved by the kinetic treatment from 15/20 to 22/20, the left eye's vision from 14/20 to 21/20, while in the 13 cases where the improved sight for the two eyes together only

was recorded, the averages are 10·5/20 before and 15·5/20 after the treatment. As will be seen, the improvement in a high percentage of cases progressed from what is considered as normal vision, 20/20, to the better vision, of 22, 24, 25, 33, and in one case even to 40/20. This, I think, is an important observation, showing that many people with potentially supernormal sight suffer eyestrain (astheno-vergence) so that they only have "normal" sight. In the series of cases recorded above, 17 out of 51—i.e., one-third—are in this group. Another group of 12 had only slightly subnormal vision (17/20); six of them improved to supernormal vision. Instructive also

TABLE I.—*Vision of Each Eye Separately Before and After Treatment for Astheno-vergence.*

The figures for the left eyes are ranged directly opposite their corresponding right eye.

RIGHT EYE.		LEFT EYE.		RIGHT EYE.		LEFT EYE.	
Before.	After.	Before.	After.	Before.	After.	Before.	After.
1·5	5·5	2	5·5	17	20	17	20
3	4	5·5	11	17	25	17	25
4	17	4	17	17	20	17	22
4	4	1·5	3	18	20	18	20
5·5	20	5·5	20	20	30	20	30
5·5	5·5	1·5	5·5	20	30	20	30
8	17	8	17	20	30	20	30
8	11	8	11	20	30	20	30
8	20	5·5	17	20	40	20	40
8	11	8	11	20	24	20	24
11	20	22	22	20	24	20	24
11	25	5·5	11	20	25	3	5·5
17	25	22	25	20	25	20	25
17	25	17	25	20	25	20	25
17	25	17	25	20	33	20	33
17	25	17	25	20	33	20	30
17	20	20	20	20	33	20	33
17	20	11	20	20	25	20	20
17	20	17	20	22	22	17	22

TABLE II.—*Vision of Both Eyes Together Before and After Treatment for Astheno-vergence.*

Before.	After.	Before.	After.
0·5	4	11	20
1	3	17	20
1·5	5·5	17	22
5·5	11	20	24
5·5	11	20	24
8	11	20	25
11	20		

are the figures of those who having only 11, 8, 5·5, and still lower visions, in some cases, improved to "normal" and, in one case, to supernormal (25/20) vision.

The frequency of this form of amblyopia (25 per cent. of my eyestrain cases), its high amount (averaging 50 per cent. of the actual vision), and its curability (100 per cent.) by kinetic treatment, appear to deserve attention as important indications for the routine application of this form of treatment. The medical profession, by the invention and accurate prescribing of glasses for the correction of vision, has enormously enhanced the visual efficiency and comfort of mankind but I think the time has come to take a further step. This step is to diagnose one of the main causes of partial loss of sight, and to cure the defect permanently by kinetic treatment, without in any way neglecting the correction of refraction, whenever this is indicated after the convergence has been educated to function normally.

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TUMOURS OF THE SKIN
PRODUCED BY BLAST-FURNACE TAR.

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IN a previous paper I. Berenblum[1] demonstrated conclusively the carcinogenic property of a sample of Scottish blast-furnace tar. In a series of 150 mice, following the application of the tar to the skin of the back between the shoulder-blades, he was able to produce 26 tumours, of which three became malignant. Up to this time it had been assumed that blast-furnace tar was non-carcinogenic, as a result of the work of A. Leitch,[2] and owing to the fact that no cases of skin cancer in man arising from contact with blast-furnace tar had ever been reported. In the present communication the results of repeating Berenblum's work with four more samples of blast-furnace tar are described. Three of these tars were obtained from Scottish ironworks using splint coal, and one from an English firm using coal from a local seam.

Source of the Tars.—The charge in an iron blast-furnace consists normally of a mixture of iron ore, limestone and coke, the latter having been previously prepared from coal in coke ovens. There are, however, limited supplies of coal which is non-caking and sufficiently hard to be used directly in the charge of the furnace, usually with the addition of 5 to 25 per cent. of coke. This type of coal, known as splint coal, is almost confined to an area in Scotland. Owing to the presence of volatile matter in the coal, a quantity of tar is carried out of the furnace by the blast-furnace gas, from which it is afterwards recovered. In the blast furnace the charge is fed in periodically at the top, where the temperature is relatively low, and the coal or coke becomes slowly heated up in its gradual descent through a rising current of hot blast-furnace gas. These conditions are ideal for carrying out a "low temperature" distillation of the raw splint coal. In addition, the high oxygen content of the coal results in the production of a tar rich in oxygenated compounds, and gives to blast-furnace tar its highly phenolic character. It is also noteworthy that the total yield of tar is small, and that a considerable quantity of water is usually present.

This process is distinct from the "high temperature" distillation of ordinary gas retorts, in which the fuel is placed in a container, and is heated to bright redness from without. In the subsequent distillation of tar and gas the contact with red hot surfaces markedly alters the character of the tar constituents. Gas tar has long been known as an active carcinogenic agent.

Of the three Scottish tars used in these experiments, the actual amount of coke added to the splint coal in the charge in the case of No. 1 was 15 to 17 per cent.; in the case of No. 2 it was 25 per cent. This latter tar was dehydrated before it was delivered to the laboratory. Scottish tar No. 3 contained a large quantity of water, the excess being decanted off before use. In this case 10 per cent. of coke was added to the burden of the furnace. The furnace from which the English tar was made was charged with 75 per cent. of coal from a local seam and 25 per cent. of coke.

EXPERIMENTAL PROCEDURE.

Sixty mice were used for testing each sample of tar. The hair was clipped away with curved scissors from a small area of skin in the region between the shoulder-blades, and the tar was applied bi-weekly for the first 14 weeks, and thereafter once weekly. This change in the frequency of the tar applications was necessitated by the rather marked tendency to ulceration of the skin exhibited by many of the mice. The experiment was continued for 56 weeks, by which time all the mice had died.

In the Table are recorded the results obtained

[1] THE LANCET, 1930, ii., 1344.
[2] Brit. Med. Jour., 1923, ii., 1

with three samples of Scottish blast-furnace tar and one sample of English tar. An ether extract of the latter, prepared in the following manner, was also employed. The tar was treated with lime, and then extracted with ether in a Soxhlet apparatus. The ether was evaporated, and the residue was used for application to the skin. Previous experience in this laboratory had demonstrated that the carcinogenic power of a gas tar could be considerably increased by this method.

In the case of the three Scottish samples, the first warts appeared at the sixteenth week, and totals of 7, 10, and 8 animals bearing tumours were finally obtained respectively. Of these, the tumours became malignant in three animals. For comparison, the figures of Berenblum are also quoted. He obtained 26 tumours in a total of 150 mice, two-thirds of which received bi-weekly applications of the tar for the whole period of 38 weeks, and one-third of which received weekly applications for 32 weeks only. Three of his tumours became malignant. These results are remarkably similar to those obtained in the present experiment, even allowing for the differences in experimental technique. In the case of the crude English tar, the first wart appeared at the twenty-first week, in comparison with the twelfth week when an ether extract was used. Eight and 24 animals finally bore tumours respectively. Of these, none exhibited malignant changes after the application of the crude tar, but nine became malignant when the ether extract was used. Rather more than 50 per cent. of the surviving 25 animals bore tumours at the thirtieth week. Using a potent gas tar it is usual to obtain the 50 per cent. level between the eighteenth and twenty-first week of the experiment.

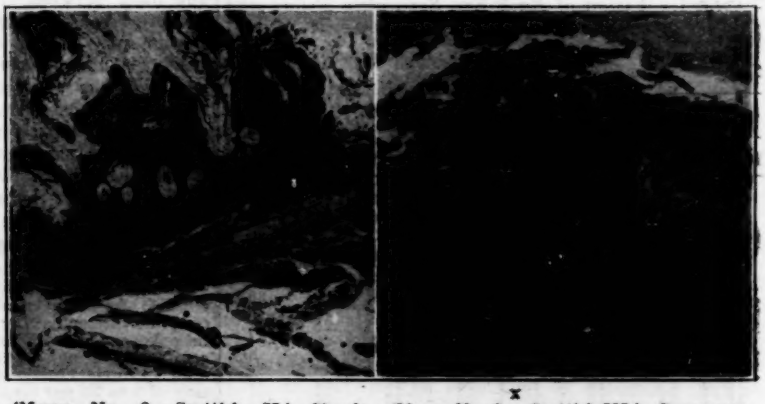
Tar sample.	Mice used.	First appearance of wart.	Total with warts.	Warts confirmed histologically.	Malignant warts.
		weeks.			
Scottish I...	60	16	7	4	0
„ II...	60	16	10	4	2
„ III...	60	16	8	4	1
English ..	60	21	8	3	0
Ether extract of English	60*	12	24	16	9

* At 30 weeks there were 25 survivors and just over 50 per cent. of these bore tumours.

Fig. 1 illustrates a typical early wart produced by blast-furnace tar. Keratinisation of the more superficial part of the tumour is usually well marked as in this case.

The malignant tumours show the structure of squamous carcinomata invading the muscular layer of the skin, and are usually surrounded by a well-marked acute and chronic inflammatory reaction (Fig. 2). One malignant tumour, obtained after 47 weeks of application of ether extract of English tar, consists of a mass of mononuclear round cells invading the adjacent muscle and fat, often seen in mitosis, and metastasising to local lymph glands.

FIG. 1. FIG. 2.



(Mouse No. 9. Scottish II.) Simple papilloma of the skin of the back produced after 35 weeks' application of Scottish blast-furnace tar. (× 25.)

(Mouse No. 6. Scottish III.) Squamous carcinoma of the skin of the back after 54 weeks' application of Scottish blast-furnace tar. X indicates position of invasion of muscle by tumour. (× 80.)

CONCLUSIONS.

From these results it is possible to conclude that blast-furnace tar obtained from a variety of sources is able to produce malignant tumours in mice. It is less active than the gas tar employed in this laboratory, but its carcinogenic properties can be enhanced by extraction with ether. Berenblum pointed out that his sample of blast-furnace tar contained a large quantity of water. Of the samples used for these experiments, Scottish No. II. was dehydrated before receipt, and produced two malignant tumours in 60 mice. Scottish tar No. III. also produced a malignant tumour. This tar contained an excess of water, which was decanted off before use. So that Berenblum's contention that the water content of the tar has no relation to its carcinogenic properties receives strong support. If applied too frequently blast-furnace tar produces ulceration of the skin, but its toxic effects are not well-marked, as was demonstrated by the fact that some of the animals survived weekly applications of the tar for 56 weeks.

With regard to the industrial aspect and the possibility of skin cancer in man arising from contact with blast-furnace tar, it appears that the workers in the ironworks do not handle the tar in the same way as the workers employed by producers of gas tar, pitch, and paraffin. In the first place the yield of tar, as stated above, is small. Secondly, blast furnace tar is regarded as a waste product and is disposed of without further handling. These considerations, together with the fact that blast-furnace tar is not a potent carcinogenic agent, are sufficient to explain the absence of epitheliomatous ulceration in blast-furnace tar workers, and it may be postulated that this tar would be carcinogenic for man as well as for mice given the right conditions for its contact with the skin.

BIRMINGHAM CONTRIBUTORY SCHEME.—Last year the membership of the Birmingham Hospital Contributory Scheme increased by 7382 to 411,584, and the amount collected increased by £2381 to £202,387. In four years the scheme has raised £746,000.

CLINICAL AND LABORATORY NOTES

PERIPHERAL NEURITIS AS A COMPLICATION OF ANGIONEUROTIC ŒDEMA.

DESCRIPTION OF A CASE.

BY W. MACKAY, M.D., F.R.F.P.S. GLASG.,
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IN a recent paper Dr. I. M. Allen [1] describes a case of "brachial neuritis and amyotrophy" associated with serum-sickness, and reviews 42 reported cases in which disturbance of the nervous system has followed serum treatment. Most of those reported have appeared in France, where it is recognised that the therapeutic injection of serum may produce neuritis. The following is a description of a case of angioneurotic œdema in the course of which peripheral neuritis developed. It seems to belong to the same category as those described by Allen yet, prior to the onset of his illness, no serum had ever been given to the patient. Such cases are extremely rare.

A man, aged 21, a bus conductor, was admitted to Prof. W. K. Hunter's wards at the Royal Infirmary, Glasgow, on Dec. 1st, 1931.

History.—He had always been well until the previous August, when suddenly he had an attack of dyspnœa resembling asthma. The difficulty in breathing was worse at nights but in a day or two it gradually passed off and the patient resumed work although he did not feel in good health. About the beginning of September he began to have transient and recurrent swellings in the eyelids and over the temples and cheeks. A little later, over various parts of the body, hot and itchy "red lumps" came and went and in the middle of October swellings of an urticarial type appeared, disappeared, and reappeared every few days. The nature of the "red lumps" is unknown. A week before admission to hospital he had shooting pains, but no swelling, in his left forearm, and within a few days he was unable to extend the left wrist. The patient denied the possibility that he had lain on his arm or that he had otherwise injured it. The family history and the patient's habits and environment did not seem to bear any relation to his illness.

On admission there was slight puffiness in the region of the eyes. The skin over the neck and trunk was covered with urticarial swellings of a dirty green hue surrounded by a reddish margin. Some were as large as the hand, others much smaller. There was no complaint of pain in the arm, but the patient was unable to extend the left wrist and he had difficulty in abducting the index, ring, and little fingers from the middle finger. He was able, however, to extend the two distal phalanges of the fingers when the proximal phalanges were flexed. He could bend the elbow but the supinator longus did not seem to take any part in the movement. The biceps and triceps jerks were feebly present. It was apparent that the extensors of the wrist and fingers, the supinator longus, and the interossei were the muscles involved. Appreciation of light touch, temperature, and pain was diminished over the area of the hand supplied by the cutaneous branches of the ulnar nerve. No other lesion of the nervous system was detected, and beyond the presence of numerous rhonchi in the lungs no abnormality was found in the other body systems.

Course of illness.—In from seven to ten days the urticarial eruption had almost gone but smaller patches recurred from time to time, the last patch being noted on Dec. 21st. The most prominent feature of the illness was the frequent occurrence of transitory œdematous swellings in the eyelids and lips, and over the temples and cheeks. On one occasion an œdematous swelling was observed in the anterior abdominal wall and on another, swelling of the tongue was associated with dysphagia. Pain and swelling were present in the right wrist-joint on Dec. 16th and 21st.

In the left arm, atrophy of the extensors of the wrist and fingers, the supinator longus, the interossei, and the muscles of the hypothenar eminence gradually developed and the patient became unable to extend the distal phalanges of the little finger. Electrical tests were applied, and it was reported that the hypothenar group of muscles gave no response to faradism, the interossei gave only a weak reaction, while the extensors of the wrist responded fairly strongly. The remaining muscles of the hand and arm reacted normally. All the muscles of the affected limb responded strongly and quickly to galvanic current.

Throughout the stay in hospital the temperature ranged between 98° and 100° F., although on several occasions shortly after admission to hospital it reached 101° F. At first the pulse-rate was about 130 but it settled later to between 90 and 100. There were no attacks of asthma. Three carious teeth were removed, but no other septic focus was discovered. The bleeding time was within normal limits. While urticaria was present the blood platelets numbered 1,118,000. The erythrocytes averaged about 4,400,000, and there was a degree of hæmoglobinæmia (48 per cent. to 60 per cent.). The leucocytes varied between 6200 and 7800. The Wassermann reaction of the blood was negative. The urine all through was free from abnormal constituents. Dr. C. M. Fleming found the proteose in the urine to be slightly increased in amount, but there was no cutaneous reaction to this substance on the application of scratch or intradermal tests.

Three and a half months after admission power was slowly returning to the affected muscles although atrophy was still present. The biceps and triceps jerks were active. There was still a little difficulty in appreciating tactile, thermal, and painful stimuli over the ulnar side of the hand. The recurring œdema did not respond to treatment with calcium lactate, parathyroid, horse serum, blood transfusion, or marmite, but the general health of the patient was improved and, as he was becoming hospitalised, he was discharged.

The characteristic features of this case are: transient and recurring, localised yet "wandering" œdema, urticaria, slight febrile disturbance, and occasional arthritis. They are very similar to those of serum-sickness. This disease is an expression of anaphylaxis and it is characterised mainly by urticarial swelling, œdema of various parts of the body, arthritis, mild pyrexia, and general malaise. In Allen's case and in most of those reviewed by him the signs of a neural lesion were associated with urticaria. The connexion between urticarial œdema and the disturbance of the nervous system in serum-sickness is so close that an ætiological relationship can be inferred. It is not surprising therefore that similar disturbance may arise in the course of angioneurotic œdema or, as it is sometimes called, "giant urticaria." Such a complication is extremely rare, although symptoms of cerebral origin—epileptiform convulsions, hemiplegia, deafness, and recurring attacks of blindness—have been reported (F. Kennedy [2]). No reference is made to them in well-known British, American, or French text-books.

In the case just described, the main features of the illness were established for at least two months before there was any evidence of involvement of the nervous system. A peripheral neuritis then developed, the musculospiral and the ulnar being the nerves affected. Both were implicated below the level of the elbow, and the evidence suggests that each was separately involved. In four of the cases reviewed by Allen, the musculospiral was implicated and in two of these the lesion was distal to the triceps branch. The disturbance in the nervous system in this case of angioneurotic œdema is similar to some of those occurring in serum-sickness. This is to be expected, since angioneurotic œdema, like serum-sickness, is an expression of anaphylaxis, the essential difference being that in serum-sickness the anaphylactin is known while in angioneurotic œdema its source and nature are frequently matters for conjecture. Further, the symptomatology of each is similar. The common anaphylactic origin suggests a common pathogenesis for the lesions occurring in the nervous system in the two conditions. Allen favours the view that in

[1] THE LANCET, 1931, ii., 1128.

[2] Arch. Neurol. and Psychiat., 1926, xv., 28.

serum-sickness "local and general œdema" explains the paralysis of single nerves. It is easy to suppose that the change which permits the transudation of serum through the capillaries of the skin and mucous membranes will also take place within the internal structures of the body. In the case under discussion, it is possible that a localised œdematous swelling in the connective tissues of the affected nerves brought about a compression paralysis.

It must be concluded therefore that this case of angioneurotic œdema with peripheral neuritis belongs to the same category as those of serum-sickness, showing similar disturbances in the nervous system.

I gratefully acknowledge my indebtedness to Prof. Hunter for permission to publish this case.

RETENTION OF URINE IN A CHILD, DUE TO AN APPENDIX ABSCESS.

BY H. LOVELL HOFFMAN, M.B. CAMB.,
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A BOY, aged 4 years, was admitted to the Royal Northern Hospital on July 8th, 1931. A week before admission he was said to have had an attack of abdominal pain, during which he vomited twice. After this there was difficulty in micturition, the urine being noted to be dark and scanty. The child had passed no urine at all during the 24 hours before admission, and the bowels had not been open for two days.

State on admission.—Pale child, in no distress. Temp. 102°. Pulse-rate 126. Resp. 23. A swelling was found rising out of the pelvis, dull to percussion, and apparently a distended bladder. There was no abnormality in the penis, the child having been circumcised one year previously. Per rectum an indefinite tender swelling was felt on the left side. The heart, lungs, and central nervous system were normal.

On admission the child was catheterised twice, 9 oz. and 3 oz. of urine being obtained in scanty drops. Great difficulty was experienced in passing the catheter, a fine gum-elastic one being used on the second occasion. After catheterisation the abdominal swelling remained. The urine was acid with a trace of albumin and a few epithelial cells. Radiography of the urinary tract revealed no evidence of calculus.

Progress.—The child was catheterised daily from admission, with results similar to those at the first attempt, the daily measure of urine being 10–12 oz. On July 12th he passed 3 oz. of urine naturally. He complained of intermittent pain in the left side and in the left leg. Mucus was noted in the stools.

On July 13th the temperature was 99·8° and the pulse-rate 130. Tongue furred, lips dry, fæcal odour in breath. Leucocyte count 32,000 per c.mm., 61 per cent. polymorphs.

On July 14th intravenous pyelography was performed, 12 c.cm. of abrodil being used. A bilateral hydronephrosis and hydro-ureter were seen. A cystogram showed a normal bladder outline. A cystoscopy was performed by Mr. Kenneth Walker under general anæsthesia, the interior of the bladder being found to be normal. The bladder was emptied and a bimanual examination was carried out. A swelling could be felt, extending up to the umbilicus, which could be pressed down on to a finger in the rectum, and appeared to be cystic in character.

On July 15th the blood-urea was found to be 21 mg. per 100 c.cm. A diagnosis of pelvic suppuration was made, and it was decided to explore the abdomen.

On July 20th an attempt, during the morning, to pass a catheter proved unsuccessful. By 2 P.M. the temperature had risen to 103·5°. (The child had been catheterised daily up to this time.)

First operation.—At 3 P.M. Mr. L. E. Barrington-Ward opened the abdomen through a left subumbilical paramedian incision. The bladder was distended and caused considerable difficulty throughout the operation. The intestines were firmly fixed to the posterior surface of the bladder and the cæcum appeared to be involved in the mass of adhesions. The appendix was not seen. These adhesions were separated with the finger right down to the neck of the bladder, and in this situation a cavity was opened, from which welled up 2 oz. of foul yellow pus, arising, apparently, from a low pelvic appendix. The abscess was drained and the abdomen was closed, a catheter being tied into the urethra. The patient stood the operation well; by the next day the catheter had drained 12 oz., and there was not much discharge from the abdominal wound. On July 22nd the catheter was removed, and the child passed urine naturally into the bed.

Further progress.—The wound later discharged fæcal material, but was dry on August 6th, and from this date convalescence was uneventful. The child was at first incontinent of urine, but eventually regained full control of micturition. During the next six months he was seen several times. He had one attack of acute tonsillitis, but was otherwise well. He was readmitted on Dec. 13th for appendicectomy.

Second operation (Dec. 14th, by Mr. Barrington-Ward).—Incision right paramedian. On opening the abdomen, a mass was felt in the right iliac fossa consisting of cæcum and small intestines matted together by adhesions. These were separated, and in so doing a residual abscess was opened, containing 1 drachm of inoffensive pus which was sterile on culture. The appendix was found lying in the abscess cavity and running down into the pelvis. It was found, on separation, to be about 2 in. long and ¼ in. in diameter. It was removed by the usual technique and the abscess cavity was drained.

After the operation the child developed broncho-pneumonia, but made a good recovery, and was discharged fit on Jan. 10th, 1932. An intravenous pyelogram taken on Jan. 7th showed normal renal pelves and ureters.

Pelvic suppuration is a rare cause of retention of urine, and the possible mechanisms causing the obstruction may be considered under two heads—mechanical and nervous.

It seems difficult to believe that the collection of pus which was found could, by its increased tension alone, occlude the urethra; the outer walls of the abscess, consisting of intestines and adhesions, would be very much more compressible than the first part of the urethra surrounded by the prostate. There are, however, certain reflexes between the internal sphincter, the bladder musculature, and the surrounding organs. For example, the reflex between the bladder and the rectum is well known. A full rectum will cause difficulty in micturition, while a distended bladder will inhibit defæcation. The reflexes are mentioned by Janet,[1] and some authorities, for example, Li Virghi,[2] believe that the retention in cases of enlarged prostate is due to some similar effect. One can then easily imagine the congestion and induration surrounding the abscess in this case, causing irritation of the nerves and reflex spasm of the sphincter.

I wish to thank Mr. Barrington-Ward and Mr. Kenneth Walker for allowing me to publish this case.

[1] Quoted by K. Walker in Brit. Med. Jour., 1930, i., 811.
[2] Li Virghi: Jour. d'Urol., December, 1912,

"ROYAL" HOSPITALS AND HOUSE SURGEONS.—The annual meeting of subscribers to the Bolton Infirmary and Dispensary decided to ask for authority to prefix the word "Royal" to its name. The grounds for the application appear to be that the addition would "add to the importance of the institution," and that it would remove a difficulty that has been experienced in obtaining house surgeons, "the medical profession being firmly convinced that the addition of the word 'Royal' would attract the better class of medical student."

OUT-PATIENTS IN MOTOR-CARS.—At the annual meeting of the Aberdeen Royal Hospital for Sick Children, the Earl of Caithness, the president, complained that the extended medical services of the institution were being taken advantage of by a class of people for whom it was not originally intended. It was not unknown, he said, for patients to arrive in private cars which waited during their treatment and took them away afterwards. Since 1928 in-patients have increased from 1059 to 1744, and out-patients from 3900 to 6478. On the average an out-patient pays five visits.

REVIEWS AND NOTICES OF BOOKS

A System of Bacteriology in Relation to Medicine.

Vol. IX. By Various Authors. Edited by P. FILDES, M.B., B.Ch., O.B.E., and Prof. J. MCINTOSH, M.D. London: H.M. Stationery Office. 1931. Pp. 364. 21*s*.

THIS volume is the last of the "System of Bacteriology in Relation to Medicine" published under the auspices of the Medical Research Council. Entirely different in its scope, it is a worthy successor to its predecessors. It is devoted entirely to technique and no discussion of general principles or of theoretical considerations finds a place in its pages. To be severely practical has been the aim of the editors.

In their prefacing note they abjure any attempt to cover the whole of the vast field of bacteriological technique and they adopt as their guiding principle the criterion of results. "An editor," they write, will "realise that someone he knows is notoriously capable of reproducing by one method the results supposed to require several hundred," and this has been the basis of selection exercised. This method of selection may entail the omission of methods which in many hands have worked well, but hardly in any other way is it possible to blaze a clear and definite trail through such a tangled jungle as that of present-day bacteriological technique. To define such a clear and easily followed path has been the aim of the editors and in it they have succeeded admirably. Besides such general matter as concerns the staining of micro-organisms and the preparation of culture media, full descriptions are given of many methods necessary for the study of the metabolism of bacteria, for the majority of which laborious reference to the periodical literature has up to the present been necessary; thus concise instructions are given for the identification and estimation of bacterial metabolites, for estimation of the pH, of electric charge, and on many other matters. To the investigator in the higher branches of bacteriological research such a collection of technique as this must save untold time and trouble; to the routine laboratory worker faced with the setting up of an unfamiliar technique the book will also be a boon; to such the sections on the care and breeding of laboratory animals will be of service.

The opening sections by a happy inspiration are devoted to a description of two of the most up-to-date laboratories in the British Isles, the Sir William Dunn School of Pathology at Oxford and the Department of Pathology of the University of Cambridge. It is probable that few readers of the book will be called upon to plan university laboratories, but many may be called upon to build up laboratories on a smaller scale and to survey the ideal even though unattainable is a salutary exercise. To those called upon to plan and equip even the smallest laboratory the details of treatment of benches, plumbing, water-supply, and so forth given in respect of the Cambridge department will be of the utmost value.

The absence of some such standard work as this has long been something of a reproach to English bacteriology. Its appearance draws attention to the equal need for some such authoritative compendium covering the whole field of pathological technique, particularly in its application to clinical medicine.

A Course in Practical Biochemistry.

Second edition. By A. T. CAMERON, M.A., D.Sc. Edin., F.I.C., F.R.S.C., Professor of Biochemistry, Faculty of Medicine, University of Manitoba; and FRANK D. WHITE, A.R.T.C., Ph.D. Edin., F.I.C., Assistant Professor of Biochemistry in the Faculty. London: J. and A. Churchill. 1932. Pp. 237. 8*s*. 6*d*.

THE appearance of the second edition two years after the first indicates the popularity of the book. Prof. Cameron has done great service in producing two works which are of the very greatest assistance to the teacher of biochemistry. His text-book has been referred to in these columns, and it is with pleasure that the present new edition is noted.

The course here described is much more elaborate than that given to most English medical undergraduates. Those familiar with Canadian and American medical education will remember that much more time is devoted to practical laboratory work in physiology and biochemistry there than here, the less intensive study of anatomy making this possible. The book is divided into two main sections, Part I. dealing with qualitative, and Part II. with quantitative and clinical procedures. Part I. contains all the details to be found in most English courses of practical biochemistry, such as tests for proteins, fats, carbohydrates, and enzymes. Part II. is by far the more interesting from the point of view of the English teacher. In most medical schools very little quantitative biochemistry is done; for example, the use of the colorimeter for the analysis of blood, the performance of gastric analyses, the estimations of alkali reserve, and of basal metabolic rate are only just beginning to be taught. The subjects are treated very clearly, and any student after passing through a department of biochemistry, working conscientiously through the course described, would be well equipped. The student will find the information here set out of the greatest value right through his medical course, and if he buys this book will not have to supplement it later with works on chemical pathology or clinical chemistry.

Chirurgische Indikationen.

By Prof. Dr. KARL RESCHKE, Oberarzt der Chirurgischen Universitäts Klinik, Greifswald. First (General) Part. Berlin: F. C. W. Vogel. Pp. 357. R.M.22.

SOME years ago in France appeared a book on "Surgical Therapeutics" by Leriche and Lecène, which approached the subject from a somewhat original standpoint. They assumed every surgical problem to be essentially an intellectual one. The plan resulting from this mental deliberation requires a special technique for its execution, and operative procedures were excluded from consideration. Prof. Karl Reschke has for Germany written one part of a book to a very similar design. The volume before us is concerned with what is known as general surgery. But it is more than that, for, to avoid overlapping, the consideration of much usually relegated to the special part is dealt with here: a welcome innovation and a satisfactory arrangement. It is true that much of the knowledge offered is set out in general text-books, but where it is unencumbered by pathological descriptions and accounts of operations, far more

stress can be laid upon the evidence for and against the various methods of therapy, and far more space devoted to these important considerations. If the reader should want to know more exactly on what the judgments here recorded are based, there is an excellent bibliography which will refer him to the original sources.

The whole book is well conceived and very well executed. It is interesting to read and contains readily accessible information, to obtain which otherwise would often require an arduous search of the literature. As examples we can ascertain the prospect of gangrene after ligation of any of the main arteries, the probable results of tendon suture, and the indications for and disadvantages of avertin narcosis, while there are excellent summaries of the position of spinal anæsthesia, the different methods of administration of tetanus antitoxin, the value of X rays in lymphatic gland tuberculosis. In his preface Prof. Reschke, while voicing the hope that his book may be of use to students and junior practitioners, modestly observes that the experienced surgeon will gain nothing new from it but will only be confirmed in his agreement with or dissent from its expressed views. But there seems little doubt that many experienced surgeons will read the book with considerable interest, and scarcely with no profit at all.

The feeling amongst some physicians that the surgeon is too much obsessed with his technique is belied by such works as this. Indeed amongst modern surgeons there is rather the danger of underestimating the extreme importance of operative skill. The substance of this book is the purely mental processes of surgery, hence there is no need for illustrations, and there are none.

Text-book of Histology.

By EUGENE C. PIETTE, M.D., Pathologist and Director of the Laboratory of the West Suburban Hospital, Oak Park, Illinois. Philadelphia: F. A. Davis Company. 1931. Pp. 466. $4.50.

IN recent years there has been a revival of interest in histology, especially in the United States. Dr. Piette's contribution to the rapidly growing collection of text-books is a reliable work in so far as the reading matter is concerned. It presents concise and not too detailed descriptions of structure, accompanied by short notes on function. Heavy type has been liberally interspersed to facilitate revision work. The matter presented is complete and up to date; research work on histology is adequately reviewed and recent advances in the subject are clearly summarised. The names of many authors are cited, and these are gathered together in an "authors index" at the end of the book; but this list will give little help to the student, since no bibliographical references to their works are supplied. The feature of the book which calls for adverse criticism is the illustrations. These are nearly all borrowed from other works. Some of them are bad and many are inappropriate to the text. For example, on page 208 occur the following lines on the thyroid follicles: "They are lined with one layer of cuboidal (seldom flat or columnar) epithelium; the cells are united by terminal bars (Fig. 136)." The illustration of the thyroid gland referred to (which, incidentally, we would not accept as a true representation of the normal thyroid) is of too low magnification (×80), to demonstrate individual cell structure, and terminal bars are not mentioned in the legend to the picture. Another unfortunate feature is that, when references are made to figures placed at distant parts of the book, the number of the figure is given but not always the number of the page. This would be inconvenient even if all the numbers had been carefully confirmed, but this has not been done. For example, reference is made on page 311 to Fig. 206, which ought to represent a "corpusculum renis" but which in fact represents a ureter of an executed convict. There are other errors; for example, the XII. in the last line of page 201 should read X. The style is strongly American and words like "cellulipetal," "increts," and "excrets" are freely used. In spite of these inconveniences the book makes pleasant reading.

The Psychology of Children.

1. *Psychology and Psychiatry in Pediatrics.* New York City: The Century Company; London: D. Appleton and Co. 1932. Pp. 146. 7*s.* 6*d.*

2. *The Robinsons.* By THOMAS E. LAWSON, L.R.C.P., L.R.C.S. Edin. London: The C. W. Daniel Co. 1932. Pp. 44. 1*s.*

1. THIS is the report of a subcommittee of the White House Conference, and it is not made clear to the reader how the discussion came about, of what personnel the various committees and subcommittees were composed, what were their terms of reference, or to whom the report is addressed. This makes the task of the reviewer difficult because to allude to omissions might mean that the reproach referred to matters which were never intended to come up for discussion. We may draw attention with approval however to the series of conclusions to be found on page 42. Whoever came to these conclusions, and with whatever purpose in view, there can be no doubt of their soundness. Adequate care of children cannot be given without intelligent attention to their intellectual and emotional difficulties. The view that the doctor without being an expert can acquire "psychiatric intelligence" is supported by insistence upon his exhibition of "patience, curiosity, tolerance, and almost invincible optimism." The subcommittee believe that if doctors in large numbers acquire "psychiatric intelligence," and become sensitive to the educational implications of the situations which arise in their practice, expert psychologists would be more often called to advise in difficult cases, to the great advantage of home and school training.

2. Character studies of a family epitomise the influence of environment on the growing child during the first few years of his life, thus indicating the responsibility which rests on all whose duties bring them into close contact with children. The pamphlet is the story of five ordinary people told fluently and humorously, and as Sir Arbuthnot Lane says in a prefatory note, the result is five tragedies. The author has limited himself, or nearly, to depicting the influence of one factor in the child's environment—namely, that of place in the family—and he shows cleverly how the personalities of the parents interact to the benefit or the detriment of their offspring, when favouritism or coldness is manifested. The Robinson circle consists of a hypochondriac, ineffective father, a capable conceited mother, an elder son whose moral rectitude is outraged by the behaviour of an elder daughter, who might have been described indelicately in a monosyllable, and a younger son, the baby of the family, who develops into a very disagreeable fellow for reasons well set out. There is much acute observation in this unpretentious little volume.

THE LANCET.

LONDON: SATURDAY, APRIL 9, 1932.

CHRONIC DUODENAL STASIS.

MUCH has been written, but not so much is known, about chronic duodenal stasis. There are big differences of opinion about it. In most English text-books, for instance, it receives scant mention, and the impression is conveyed that it is rare. In France, on the other hand, they think it important; and in a large new manual of medicine and surgery we find more space devoted to "chronic incomplete stenosis of the duodenum" than to duodenal ulcer itself. According to a recent review by Prof. F. DE BEULE, of Ghent, and others,[1] the condition, though little recognised, is actually common and of corresponding importance and interest. Its existence was suggested by ROKITANSKY as long ago as 1842, and later by GLÉNARD in 1887, but it is only in recent years, with further advances in radiology, that more complete investigations have made it possible to fill in the clinical picture. The duodenum, it may be recalled, is normally fixed by the peritoneal reflection and some three or four "ligaments"; it is crossed by the mesocolon and the root of the mesentery carrying the superior mesenteric artery. Anatomical abnormalities, either congenital or acquired, might thus mechanically compress or obstruct it, and lead to a condition of stasis and dilatation. Of such causes DE BEULE gives numerous examples, as for instance, congenital bands and acquired adhesions around the duodenum following inflammation from cholecystitis, pancreatitis, or even more distant infection such as appendicitis. The latter he suggests acts through a lymphatic spread and is of particular importance. Other causes of duodenal stasis are grouped under the headings of: (1) duodenal ileus, or paralysis due to inflammatory processes such as duodenal ulcer; and (2) stasis following disordered balance of the autonomic nerves (vagus and sympathetic). These groups are rather less definite in their ætiology. H. F. SHATTUCK and H. M. IMBODEN,[2] who report 46 cases in which the diagnosis of chronic intermittent duodenal obstruction was made, considered that bands and adhesions or pressure from the mesenteric pedicle were the two most usual causes. Other workers have found no mechanical obstruction in some 30 per cent. of cases of true megaduodenum, and SCHMIEDEN and KRAAS[3] not long ago reported the operative cure of two cases in which the duodenum was as large as the colon, although there was no apparent obstruction.

Two years ago REGINALD MILLER with H. C. GAGE[4] drew attention to chronic duodenal ileus in children associated with enlargement of the stomach. In describing their own series of cases they mentioned the fact, as noted by other observers, that adults with chronic duodenal ileus might give a history of symptoms during childhood which had ceased for many years during adolescence. In children the main symptoms, as described by MILLER and GAGE, are anorexia and vomiting with malnutrition and lack of growth; there is a comparative absence of pain in the abdomen except immediately before vomiting. In the adult the typical symptoms are described as being cyclical crises of abdominal pain with bilious vomiting and a sensation of weight and distension in the epigastrium; the absorption of toxins from the duodenum gives rise to such general symptoms as headache after meals, and loss of weight and energy. Various groups of symptoms are said to simulate cholelithiasis, appendicitis, and simple duodenal ulcer. Radiographically, by which means the diagnosis has finally to be made, the main features of chronic duodenal stasis are given as: delay in passage of the meal through the duodenum (according to DE BEULE and DE WITTE longer than 15 seconds), dilatation of the duodenum, and the presence of abnormal peristaltic and antiperistaltic waves. Treatment must be mainly directed to the cause. Often it must be surgical, and duodeno-jejunostomy is recommended as giving excellent results in many cases, though other forms of operation have been proposed and practised. In children, as MILLER points out, medical treatment is as a rule desirable, since spontaneous improvement seems to take place at the age of about 5 years. This treatment should aim at lessening the bulk of the diet and the frequency of the feeds—the object being to discourage any associated enlargement of the stomach. Even in adults many clinicians advise a thorough trial of medical measures. Of these, postural treatment is regarded as important and considerable relief is obtained by adopting the knee-chest position or by lying on the chest or on the left side. The diet advised is similar to that generally in use for gastric ulcer. Abdominal massage and the use of a suitable belt are also recommended. If, however, we are to believe that a mechanical obstruction is the most frequent cause, it is hard to see that non-surgical treatment can be an effective cure, especially in view of the reported success of surgery even in non-obstructive cases.

Cases of congenital mechanical obstruction of the duodenum are rare, and actual duodenal stenosis, from whatever cause, is certainly less common than pyloric stenosis. But minor degrees of "ileus" may perhaps be commoner than is generally realised. There is a large group of chronic dyspeptics offering vague symptoms, with discomfort and nausea after meals and a feeling of distension in the epigastrium; and in many of these cases no evidence of gall-bladder or other abdominal disease can be found. In some of them attacks of profuse biliary vomiting occur periodically, closely resembling migraine. Of SHATTUCK and IMBODEN'S patients a large

[1] Bruxelles Méd., Jan. 17th, p. 332.
[2] Jour. Amer. Med. Assoc., March 19th, p. 943.
[3] Med. Klinik, 1931, xxvii., 1445.
[4] Arch. Dis. Childhood, 1930, v., 83.

number had suffered from "bilious attacks" even since childhood, sometimes with unilateral headaches; and more than half had had their appendices removed without relief. Such a condition is apt to be labelled nervous indigestion or visceroptosis, but the patient may in fact be suffering from mild duodenal stasis. The accompanying symptoms of fatigue, headache, and the like, so often encountered in these cases, could certainly be produced more easily by absorption of toxins from the small intestine than from the large, and a duodenal "constipation" must be a far more serious thing than colon constipation. The question is undoubtedly one of real practical importance and it is to be hoped that further work, especially radiological, may show to what extent duodenal stasis may really be a cause of chronic indigestion. If we are to believe the French authorities we must regard it as one of the commonest causes of otherwise unexplained digestive symptoms. But its true incidence is at present the most doubtful thing about it.

WATER METABOLISM AND EPILEPSY.

IN their comprehensive monograph on epilepsy W. G. LENNOX and S. COBB [1] attribute the following statement to Hippocrates or one of his pupils:—

"But whoever is acquainted with such a change in men and can render a man *humid or dry*, hot or cold by regimen could also cure this disease (epilepsy), without minding purifications, spells and all other illiberal practices of a like kind."

Their survey of recent metabolic research in this disease has led them to paraphrase this passage as follows:—

"Whoever is acquainted with physiology and can render a man acidotic, dehydrated and fully oxygenated could also repress this disease, without minding purification of narcisistic personalities, ritualistic empirical diets and all other illiberal practices of a like kind."

Much interest has lately been focused, in America, on the possibility that the convulsions of epilepsy may be the expression of an underlying instability in water balance. It is certainly somewhat striking that several therapeutic measures which have been found to be of greater or less value in controlling convulsions—such as starvation, ketogenic diets, extreme limitation of fluid intake, and administration of acid-forming salts like ammonium chloride—have one effect in common, a depletion of the body fluids. Equally interesting is the work of I. MCQUARRIE,[2] who has been able to produce fits at will, in epileptic children, by increasing the intake of water and at the same time postponing diuresis by injections of pituitrin. These circumstances have led some writers to the conclusion that the epileptic convulsion is caused by an accumulation of cerebro-spinal fluid in the subarachnoid and perivascular spaces of the cerebral cortex. TEMPLE FAY [3] believes that lesions of the Pacchionian bodies may be responsible, by interference with the egress of cerebro-spinal fluid. G. W. SWIFT [4] suggests that developmental abnormalities of the great venous sinuses may sometimes cause a similar obstruction, and has devised an operation for mobilising the lateral sinuses, which, he claims, decreases the obstruction, and, in selected cases, often relieves the convulsions. The anatomical vagaries of the veins draining the brain are so erratic, however, that it must be difficult to draw the line which separates the normal from the abnormal. Nor can this conception of epilepsy be satisfactorily reconciled with present knowledge. The subarachnoid spaces are admittedly often dilated in epilepsy, but it is hard to prove that this change is not the result of cerebral atrophy. Moreover, it is evident from elementary hydrodynamic principles that obstruction to the outflow of the cerebro-spinal fluid through the Pacchionian bodies must lead to a uniform rise of pressure throughout the ventricular system. Increased intracranial tension causes a very distinct clinical picture of headache, vomiting, papilloedema, and slowing of the pulse and respiration, and it is significant that the epileptic convulsion is preceded by none of these signs.

It is clear that the evidence does not support the interpretation outlined above. It does not follow, from the fact that *artificially* provoked dehydration may abolish, or water retention precipitate, fits, that the *spontaneous* convulsion is due to water retention. There is, in fact, no direct evidence that such is the case. And in this connexion some important observations, published by J. L. GAMBLE and B. HAMILTON in 1927, which have been widely misinterpreted, deserve comment. These workers found that in epileptic children the excretion of water, sodium and chlorine increased during periods of convulsions and fell during the intervals between attacks—changes which indicated alternate release and retention of extracellular fluid by the tissues. GAMBLE and HAMILTON themselves were intentionally non-committal about the import of these fluctuations, but subsequent writers have assumed that the retention of fluid before the convulsion constitutes the primary change, neglecting the more cautious alternative explanation—namely, that the convulsion itself causes a loss of body fluid, which is in turn succeeded by reactionary retention.

To exactly what extent disturbance of water balance enters into the ætiology of epilepsy must remain, for the present, unsettled. Meanwhile, to quote LENNOX and COBB, "The painstaking accumulation of apparently unrelated facts must go on until, like stones for a mosaic, they are sufficient in number to permit their assembly into a complete and intelligible design."

CRITICISM OF DIET.[5]

THE Advisory Committee on Nutrition, in a recent memorandum to the Ministry of Health on the criticism and improvement of diets, have been admirably concrete in their recommenda-

[1] Medicine Monographs, 1928, xiv., 153.
[2] Amer. Jour. Dis. Child., 1929, xxxviii., 451.
[3] Amer. Jour. Psychiat., 1930, ix., 667.
[4] Surg., Gyn., and Obst., March, 1932, p. 566.
[5] Report on Diets in Poor-law Children's Homes. Memorandum on the Criticism and Improvement of Diets. H.M. Stationery Office. 3d. each.

tions. The members of the Committee are: Prof. Major Greenwood (Chairman), Dr. G. F. Buchan, Prof. E. P. Cathcart, Sir Frederick Gowland Hopkins, Miss Jessie Lindsay, Prof. E. Mellanby, and Prof. V. H. Mottram; a veritable array of exact informants. A diet to be satisfactory must fulfil four criteria: it must have an adequate caloric value and must contain a sufficient amount of first-class protein, mineral matter, and vitamins. The proper distribution of calories for a grown man is achieved if he takes 100 grammes of protein, 100 grammes of fat, and 400 grammes of carbohydrate per day. First-class protein, that is, protein with a high biological value, is found in cheese, eggs, fish, meat, and milk, and should be taken by a grown man to the amount of about 37 grammes, or 5 per cent. of the total caloric intake in the day. The Committee find that if a diet contains milk, and dairy produce generally, fish, eggs, vegetables and fresh salad (the "protective foods," protecting the body against deficiency diseases) there is little need to criticise it as regards mineral and vitamin content; and it is old experience that if the caloric, protein, and vitamin contents of the diet are adequate the carbohydrate can be left to take care of itself. Probably the mineral matter and vitamin content of the diet are satisfactory if made up as follows for one day and one person: 1 pint of milk; one orange, tomato, or helping of raw salad; one ounce of butter or vitaminised margarine; and, in addition weekly, especially in winter, some fat fish, such as herring; or, daily, half a teaspoonful of cod-liver oil. Defective diets in this country are usually the result of unscientific economy. Most institutions recognise certain foods which are cheap sources of calories, such as flour, oatmeal, bread, the pulses, dripping, margarine, treacle, sugar, and not far behind, butter, cheese, jam, bacon, and dried fruits. Cheese, herring, fish roe, and sprats are recommended by the Committee as economical sources of first-class protein, and need little cooking. Skimmed milk, if available, also provides first-class protein cheaply, and at the same time is valuable as a protective food. If margarine is to be given instead of butter, a brand should be used which can be shown to contain vitamins A and D. Diets are often found to be deficient in vegetables, both cooked and salad vegetables, particularly during the winter months, and the Committee point out that there is little excuse for this in England, where tomatoes, celery, lettuce, endive, and watercress are easily and cheaply obtainable during the autumn and winter; a more general use of carrots, oranges, and lemons is also advisable.

In a report on diets in poor-law children's homes the Committee were able to show some of the ways in which institutional diets might fall short of their criteria. Much depends on the capabilities of the officers in charge of the homes; in certain of the scattered cottage homes a foster mother may be in almost sole control of about a dozen children, and is often directly responsible for the choice and purchase of food, as well as for cooking it. The cost of feeding these children is surprisingly low; in one case the allowance for food and cleaning materials for 12 boys and a foster-mother was £3 4*s*. a week, but it must be borne in mind that much of the food is bought at contract prices, so that the cash allowance has a greater value than it would if retail prices were paid. The Committee made the interesting observation that the cost of food per head in homes visited in the north of England exceeded that in homes visited in the south, despite the fact that prices in the north were on the whole lower than in London and the home counties. The additional cost was reflected in a better standard of feeding in the northern homes. The quantity of food supplied appeared to be sufficient, and there was reason to suppose that in general the children were better fed than they would have been in the ordinary homes of children of a like class. But the diets were open to criticism, usually under three heads: a desire to keep cooking down to a minimum; a lack of knowledge of food values; and a tendency to monotony. Three meals a day were served, breakfast from 7.30 to 8 A.M., dinner at 12.30 P.M., and tea at 5 to 5.30 P.M. In one home for children under 5 years of age breakfast was given at 7.30 A.M., dinner at 11.30 A.M., and tea at 3.30 P.M. We agree with the Committee in regarding this long interval between tea and the following breakfast as being most undesirable, more especially as their investigations show that both tea and breakfast were likely to consist only of bread, margarine, and cocoa.

Monotony was often the outcome of a fixed schedule of diet arranged to cover a week. The Committee advise that such schedules should be made to cover 8, 15, or 22 days, and provide an example of an eight-day schedule as an appendix. Dinner was the main meal of the day in all the homes and generally consisted of meat and two vegetables followed by a sweet. The usual constitutents of breakfast and tea have already been mentioned, but in some of the northern homes bacon was sometimes given for breakfast and tea was enlivened by tripe or stewed fruit. The Committee advise a redistribution of the food values over the three meals to avoid the concentration of most of the first-class protein, and probably most of the interest, in the mid-day meal. The supply of raw fruit was unsatisfactory, they found, and it seems more often to be regarded as a luxury than as a necessary part of the diet; cheese and cheese dishes are also subject to an unexplained neglect, and little use seems to be made of watercress, even where abundant supplies are available. The existence of brands of margarine containing added vitamins does not seem to be generally known, and is certainly not sufficiently advertised by the makers. The Committee head their recommendations with the suggestion that a pint of milk daily should be allowed for each child and that special care should be taken to see that the full amount is received by every child under 16. They include a number of economical and nourishing recipes in an appendix which would repay study by all those responsible for institutional cookery on a large scale.

CRIME IN 1930.[1]

THE Criminal Statistics for the year 1930 present a somewhat depressing picture. Crime, it seems, is on the increase in England and Wales, and the ranks of the criminals are being recruited from among the youngest generation. The official commentaries on the Statistics for 1928 and 1929 had prepared us to expect a continuing addiction to lawless and adventurous crime on the part of the "war-juvenile" offenders who were deprived of full parental supervision 15 years ago. We might have guessed perhaps the effect of unrelieved unemployment upon the young, the stimulus of lurid cinematograph films, and the criminal possibilities which the mechanical bent of modern young people can find in the exploitation of the motor-car. Nevertheless, with the birth-rate falling and with the prolongation of life revealed by modern actuarial expectancies, it is startling to discover that two-thirds of all the persons found guilty of crime in 1930 were below 30 years of age, that two-fifths of the gross total were under 21, that only 7 per cent. of that total were over 50, and that even persons of the active ages from 30 to 50 constitute only 1 in 4 of the guilty. There is evidence that, in the face of this increase in crime, the courts in 1930 imposed more sentences and heavier sentences; but the young cannot be sent to prison till the full resources of the probation system and of Borstal Institutions have first been exhausted. Evidently the Probation of Offenders Act has been freely used, for, out of more than 11,000 boys found guilty, 89 per cent. were placed on probation. Offenders of both sexes and of all ages have had the benefit of the Act. The total of persons found guilty in 1930 was 56,767. No less than 28,365 of these (almost exactly half the total) were dealt with under the Probation of Offenders Act; of the remainder who had to receive some form of sentence, 13,762 were sent to prison, 532 to penal servitude, and about 750 to Borstal Institutions.

Official comments indicate that the increase in crime in 1930 lies mostly in offences against property. The position seems worst in the north of England where industrial depression has been severe. Small thefts have risen everywhere; "breakings-in" and kindred offences have risen too; violence against the person (other than sexual assaults) is rising; blackmail cases jumped to 94 from the previous year's figure of 49; and bigamy, after declining in the post-war years, is on the up-grade again. Two years ago the official editor of these Statistics remarked upon the relative constancy of the numbers of murders known to the police; it was then pointed out that, over a period of 60 years, the annual total had not fallen below 100 nor risen above 200. In 1929 there were 103 cases, excluding deaths of persons aged less than one year. In 1930 there were known to the police 75 cases of murder in respect of 86 persons aged one year or over. Here, therefore, we have a notable decrease. The murderer or suspect committed suicide in 32 cases (involving 42 victims); in 35 cases 36 persons were arrested; in 8 cases no arrest was made. Of the 36 persons arrested 9 were acquitted or were discharged at the police-court, 4 were found insane on arraignment, 11 were found "guilty but insane," and 12 were convicted, 6 of the 12 being hanged. Of the 8 cases in which no arrest was made, 3 of the victims had died following illegal operations; these deaths presumably increased the inevitable difficulty of obtaining evidence against a criminal abortionist. The tables show that 53 persons were charged with the offence of procuring abortion (15 males and 38 females). Twelve were acquitted; the remaining 41 persons were convicted, with the result that 10 were sent to penal servitude and 22 to imprisonment, while 9 were released upon recognizances without a probation order. This total of 53 persons charged compares with totals of 43 for 1929 and 73 for 1928. The annual average for the period from 1920 to 1924 was 32. Though the annual totals show a tendency to rise, medical practitioners can form their own opinion of the success of the police in bringing this class of offender to justice. The year 1930 shows an all-round decrease in the figures of coroners' inquests and investigations, as compared with the previous year; no explanation is offered of this phenomenon which certainly cannot be ascribed to diminished vigilance. In 7673 cases there was a post-mortem examination without inquest (a slightly greater number than in 1929); the number of inquests with a jury rose in 1930 to 12,999 from the 1929 level of 12,353. If we compare the totals of the kinds of verdicts returned at inquests in these two years, we find a drop in cases of death due to want or exposure (from 133 to 93), in deaths due to excessive drinking or drug-taking (from 172 to 141), and in deaths from disease aggravated by neglect on the part of other persons (from 32 to 22). As usual the inquests on males are more than double those on females. There were 63 more suicides in 1930 than in 1929; 41 fewer attempts at suicide were brought to the notice of the police.

Those who study our Criminal Statistics regularly will regret that the chill penury of national economy has cut down the valuable introductory comments which gave the volume great sociological interest in recent years. The Home Office, having access through its own specialists and through the Prison Commissioners to a mass of important information, should make fully available to us the supplementary facts, explanations, and speculations which can enliven the arid and jejune columns of tabular statistics. Two years ago we were given 69 pages of official introduction, last year only 32; this year we have a beggarly 21 pages. Recent events in penal institutions have stirred public attention. The next annual report of the Prison Commission must not be cut down in this nip-farthing fashion.

[1] Criminal Statistics, England and Wales, 1930. H.M. Stationery Office. 1932. 3s. 6d.

ANNOTATIONS

THE FUNCTIONS OF THE TONSILS.

In spite of much research, little is definitely known about the functions of the tonsils. L. B. Seiferth,[1] of Cologne, has recently reviewed at length modern knowledge of the subject, and a perusal of his essay emphasises the scantiness of this knowledge. He discusses the possible functions of the tonsils under the headings of lymphocyte formation, defensive function, and internal secretion, and he concludes that the only function which has been proved with certainty is the production of lymphocytes. This function the tonsils share with all the lymph glands of the body, and their extirpation cannot therefore, from this point of view, do much to alter the general bodily constitution. In addition there are good grounds for believing that the tonsils play an important part in the defensive mechanism of the body, and Seiferth believes that the involution of the tonsils at puberty may be connected with the fact that by this time a satisfactory degree of immunity has been achieved. Experiments directed to prove an internal secretion have so far been so contradictory as to be quite inconclusive. Seiferth holds that the theoretical problem can have at present but little influence on the practical one of clinical treatment, which may, in his opinion, be summed up in the two words "chronic tonsillitis"; but the diagnosis of this chronic tonsillitis, and therefore the indications for operation, have not so far been greatly influenced by physiological considerations. The practical side of the tonsil problem is dealt with very directly in a letter of instruction sent to school physicians by the Department of School Hygiene of the City of Boston [2] in the hope that such carefully formulated rules should tend to bring the school and family physicians into better accord. According to these rules the school physician should recommend tonsillectomy and adenoidectomy only:—

1. If the child gives a history of repeated attacks of acute tonsillitis or quinsy sore-throat;
2. If the child has suffered from continuous head colds;
3. If the cervical glands are definitely enlarged and have suffered from acute inflammation;
4. If the child has obstructive nasal breathing (adenoids);
5. If the child has suffered from an attack of acute catarrhal or suppurative otitis media;
6. If the child is a mouth breather;
7. If the child gives a history of repeated attacks of pharyngitis, laryngitis, or bronchitis;
8. If the tonsils obstruct the fauces, making the swallowing of food difficult;
9. If the child gives a history of rheumatism, chorea, endocarditis, or nephritis;
10. If there is evidence of a continuous discharge from the nose not caused by a sinusitis or antrum disease;
11. If the tonsil is "buried" and therefore objectively not visible as a large structure but shows definite evidence of a diseased condition.

It does not, however, appear to follow that operation must be advised in all children falling into any of these groups. Nos. 4 and 6 seem to be synonymous, and it should be remembered that there are other causes of nasal obstruction in children; No. 11 appears to beg the question, for removal may be advisable when a tonsil "shows definite evidence of a diseased condition" whether it is or is not buried. On the whole, these rules should achieve the purpose for which they have been framed; but truly the "tonsil problem" is too difficult to be solved within so rigid a frame.

[1] Med. Welt, March 19th, p. 401.
[2] New England Jour. of Med., March 17th, p. 592.

GLYCOSURIA AND PREGNANCY.

The question of the significance of sugar in the urine should at all times be answered as accurately and quickly as possible so that the patient may be saved from unnecessary treatment on the one hand, or from delay in treating true diabetes on the other. In pregnancy this question arises frequently, because glycosuria without diabetes is a common concomitant of gestation. An annotation in our last issue indicated some of the dangers which have to be faced when true diabetes is present, and it is clearly of vital importance to have some ready means of distinguishing the two conditions. In the first place it is well to know how often simple glycosuria occurs in normal pregnancy, and Dr. L. A. Chase [1] has attempted to get this information. She obtained 100 specimens of urine from 18 patients in the latter part of pregnancy, and found sugar in 66 of these, while only two of the patients failed to show sugar on any occasion. Another woman carried out 100 examinations on her own urine, the tests being done four times a day for 25 days. Forty-seven of these specimens showed sugar, most often in the afternoon and rarely in the morning, but the fasting blood-sugar was normal. A further series of patients from private practice showed that glycosuria at some period after the second month is the rule in pregnancy, while in those patients in whom no glycosuria was found at any time it was easily induced by giving extra sugar in the diet. Sugar-tolerance curves were done in three cases, and curves similar to those found in renal glycosuria were found in all of these. After delivery the glycosuria disappeared quickly in all but three patients and sugar-tolerance tests done on these showed a renal leak. These have been examined at yearly intervals since, and have remained well during the last four years. Dr. Chase considers that glycosuria during pregnancy is normal and requires no treatment, and does not predispose to the development of diabetes. V. J. Harding and D. L. Selby,[2] in further discussion of the same subject, agree that its incidence is very high, and that it may be found in 100 per cent. of normal pregnancies if properly looked for. They hold that the factors which determine its presence are the diet of the patient, the volume of urine passed, and the time at which the specimen is passed in relation to the previous meal.

The common appearance of simple glycosuria during normal pregnancy may make the diagnosis of the rare cases of true diabetes very difficult for the practitioner. Clearly he cannot have complicated biochemical tests done on all patients who show a trace of sugar in the urine, but he must rely on some clinical criteria. There is certainly no single test or sign which will enable him to distinguish with certainty the two types, and the solution will depend, as in most other clinical problems, on a thorough survey of the history and findings in each individual case. Harding and Selby regard the following points as of most value in making the distinction. First, an absence of the history and symptoms of diabetes; thirst, polyuria, and pruritus vulvæ are practically never found in so-called renal diabetes. Secondly, absence of sugar in the fasting urine, unless this is very concentrated; if sugar is found a second fasting specimen should be examined after

[1] Canad. Med. Assoc. Jour., March, 1932, p. 279.
[2] Ibid., p. 283.

the patient has drunk eight ounces of water, and if sugar is again found, then the fasting blood-sugar should be determined, and this should be within the limits of normal if the glycosuria is physiological. Thirdly, an absence of ketonuria. To determine this they suggest a modification of the usual Rothera test, which is so sensitive that a positive finding in pregnancy is not significant. The Le Nobel [3] variation is less sensitive and a positive result is therefore of greater significance. Owing to the difficulty of distinguishing with certainty between glucose and lactose in the urine, Harding and Selby consider that it is safer to assume the presence of glucose when a reducing substance is found. If every case is approached on these broad lines the practitioner will find very few in which a sugar-tolerance test is necessary for diagnosis.

HIGH BLOOD PRESSURE AND RENAL DISEASE.

THE cause of the rise of blood pressure in chronic nephritis is far from clear. The view most commonly accepted is that the failure of renal function allows certain toxic pressor substances, which should normally be excreted in the urine, to remain in the circulation. The precise nature or origin of these pressor bodies is not understood, though they are thought to be nitrogenous and to be powerful vasoconstrictors. Another theory is that the actual tissue breakdown products of damaged kidneys act either directly upon the heart and blood-vessels, causing vascular spasm, or indirectly by stimulating the output of adrenalin from the suprarenal glands. A third suggestion is that the mechanical hindrance to the flow of blood through the kidneys, resulting from chronic nephritis, leads gradually to a compensatory increase of blood pressure required to maintain the renal circulation. A study of the degree of hypertension in various forms of renal disease throws some light on these mainly theoretical considerations, and M. Rosenberg [4] records some 20 cases that are of particular interest in this connexion. All the patients had died of actual uræmia with nitrogen retention in the blood, and they comprised cases of polycystic kidney, ascending pyelonephritis, hydro- or pyonephrosis, and renal tuberculosis. In other words they were cases in which there was extreme destruction of kidney tissue and a fatal renal insufficiency. In a large proportion of them, however, there was no increase in blood pressure, nor cardiac hypertrophy. Thus more than half of the 12 patients with ascending infection or urinary obstruction and hydronephrosis had a normal blood pressure with no ventricular hypertrophy; and in three fatal cases of polycystic kidney the same observation was made. It is thus again shown that there may be uræmia and complete renal failure without increase in blood pressure. Since the destruction of the kidney tissue may be extreme in these cases one must suppose that mechanical hindrance to the renal blood flow cannot at least be the sole cause of cardiovascular changes. Further, it seems improbable that mere failure of the kidneys to excrete pressor substances is enough to produce the increase in blood pressure. It is of course in chronic glomerulonephritis and arterio-sclerotic nephritis that hypertension is especially marked, and here the renal failure may be less extreme than in polycystic kidney.

This suggests that there may be some qualitatively varying product of kidney cell destruction that causes vasoconstriction and high blood pressure, or even that some primary *non-renal* toxic substance causes both the vascular and kidney changes. This last appears to be the probable explanation in a number of cases, and also the pregnancy kidney, to take an example. Rosenberg concludes that since high blood pressure, with cardiac hypertrophy, is much rarer in the cases mentioned than in chronic glomerulonephritis or renal arterio-sclerosis, the increase of blood pressure is probably due to the presence of some chemical substance quantitatively if not qualitatively different in the different lesions.

INHERITANCE OF TEMPER.

WHILE it may be a true saying that no one can be a leader of men unless he can lose his temper, it is at least equally certain that many persons have no ambition to lead anything more exacting than a quiet life, and for this purpose an even temper is an asset. Dr. G. F. Still, writing in the *King's College Hospital Gazette* for February, mentions an investigation made by Francis Galton in 1887 to decide how far the possessor of a bad temper may lay the blame on his inheritance. Galton found that in 43 families in which both parents were good tempered, 30 per cent. of the children were good tempered, 10 per cent. bad tempered, and the remainder neutral, showing no marked tendency in either direction; in 25 families in which both parents were bad-tempered the number of good-tempered children was only 4 per cent., while bad-tempered children amounted to 52 per cent. As Dr. Still points out, the issue here is not simple, because the child living with bad-tempered parents is in an unfavourable environment from the start. He mentions other factors which may be detrimental to temper, such as indigestion and the exhaustion produced by a long illness. The possibility that endocrine imbalance has a bearing on temper cannot be overlooked; irritability is a common accompaniment of puberty and the menopause, and Dr. Still refers to the comfortable temper of the cretin and the myxœdema patient, and to the improvement sometimes observed in the temper of a thin child who begins to fatten.

But he concludes that we start life handicapped or blessed by a lower or higher coefficient of irritability; "we all have our flash point of anger or irritation," he says, "but in some the flash point of irritation is lower than the average." And though he grants that some, with tactful training, may acquire an artificial repression of impulses which makes a negative substitute for good temper, for those to whom ill-temper belongs by heritage and environment he has sympathy but little hope. He takes, perhaps, rather a dark view of the case. While it is true that there is a type of temperament which can be happy in any circumstances, there is another type which can be happy in some circumstances and not in others. Most of us have encountered men who were cheerful while their affairs were in good train but who became irritable and whining in the face of disaster; the cantankerous wife of an unsuccessful husband may be transformed into a delightful person by the removal of financial anxiety. Children, it has often been observed, may behave charmingly at school and yet like a generation of vipers at home. There is, moreover, a possibility that the legend of a "family temper" may become a fetish which has to be satisfied with unwilling

[3] To 6–10 c.cm. urine add two small crystals of sodium nitroprusside. Dissolve. Add 2 c.cm. of glacial acetic acid. Mix and freely overlay with concentrated aqueous ammonia. A purple or permanganate colour develops where the liquids are mixed.

[4] Deut. med. Woch., 1932, lviii., 206.

victims. This may explain the case of a boy who constantly indulged in violent temper tantrums—"just as your uncle George used to do," he was told. His parents were sympathetic, but he made no attempt to master his rages, as they had a sound hereditary reason. But his temper in manhood was unusually equable, and a friend, father of an irritable son, asked him how he had been stimulated to make this conquest. "It wasn't a conquest," he replied. "I grew out of it, or rather it grew out of me. I know it used to infuriate me when my parents moaned about the family temper, and I used to give them something to complain about." In fact he made not the slightest attempt to control his temper at home, but abroad he learnt the need of restraint.

Although inheritance may play an important part where either good temper or bad temper is a marked characteristic of the children, a large number of people belong to the neutral group of Galton's investigation; the temper of these, it seems fair to suppose, will be made or marred by circumstance, though the bias need not necessarily be permanent in either direction. Dr. Still draws attention to the intrinsic truth of the phrases "tired and cross," "fat and jolly," and to these we may perhaps add another tag to the effect that "it's easy to be pleasant when things are going right." This was doubtless invented by a neutral-tempered person during a disgruntled phase, and probably has as sound a basis of experience as the other two. The subject might repay further research; or it might not.

ABDOMINAL SYMPATHECTOMY FOR HIRSCHSPRUNG'S DISEASE.

AT a meeting of the Section for the Study of Disease in Children of the Royal Society of Medicine, held on April 1st, Mr. L. E. Barrington-Ward read a short communication on excision of certain portions of the sympathetic nervous system within the abdomen for the relief of Hirschsprung's disease. He based his remarks on three cases recently treated in this way and as an illustration demonstrated a film showing exactly the operative procedures employed. This indicated very clearly the excision of the two presacral nerves from behind the posterior layer of peritoneum in association with certain nerve plexuses lying over the promontory of the sacrum. Sympathetic nerve-fibres were removed as high up as the origin of the inferior mesenteric artery from the abdominal aorta. As only a short time had elapsed since the carrying out of this procedure in his three cases Mr. Barrington-Ward was guarded in his remarks as to the possibility of cure, but a striking feature of each case was the immediate return after operation of the ability to pass a normal daily motion without the use of purgatives. At the same meeting Dr. J. H. Gibbens demonstrated a little girl in whom a similar operation had completely failed to give any relief and it is obvious that not every case of dilated colon is suitable for this remedy. This is well brought out in a recent paper in which E. W. Rankin and J. R. Learmonth[1] review the present position, especially as regards the modified operative procedures introduced by themselves. They discuss the ætiology of megacolon under five headings: true congenital defects, such as cause Hirschsprung's or Myà's disease, obstructive processes, anatomical factors, infective processes, and neurogenic processes. While it is usually accepted that there is no gross obstructive or faulty nervous mechanism in the congenital group of cases, Rankin and Learmonth hold that the pathogenesis is often a mixed one where various factors, outlined above, may come into play. Nevertheless in the congenital cases the deciding ætiological factor seems to be a neurogenic abnormality; but the subsequent pathological changes differ in no essential from those produced in a dilated colon due, for example, to a constricting carcinoma. This may possibly explain the reason for failure in Dr. Gibbens's patient, for such secondary change may become too advanced for nerve section to prove effective. The lower part of the large bowel receives a dual innervation from the parasympathetic and sympathetic fibres. Sympathetic fibres can be shown by experiments on dogs to carry impulses which lead to dilatation of the colon and contraction of the internal sphincter of the rectum. These fibres come in part from the large ganglia in the upper part of the abdomen, descending on the aorta to the origin of the inferior mesenteric artery, and in part from the mesially directed branches of the four lumbar sympathetic ganglia on each side. From the network of nerves round the root of the inferior mesenteric artery, two large strands become separated and pass out along the trunk of the vessel, while the remainder passes downwards as the presacral nerve or nerves to join the hypogastric ganglia. The operation devised by Rankin and Learmonth consists in resection of this presacral trunk which is followed upwards to the root of the inferior mesenteric artery and the nerves passing out along this artery are then divided. This operation appears to be the one adopted by Mr. Barrington-Ward and illustrated in his film. Rankin and Learmonth in the present paper report eight cases with successful results. The patients varied in age from 2 to 28 years. In some cases the operation on the sympathetic nervous system had been performed as long ago as 1927, so that good opportunity for seeing the actual results of the proceedings was afforded. These results seemed to have been uniformly good and taken in conjunction with Mr. Barrington-Ward's efforts in this country the future treatment of Hirschsprung's disease by what is essentially a simple procedure, as compared, for example, with excision of the colon, should be full of hope.

[1] Amer. Jour. Surg., 1932, xv., 219.

THE NEWER MATERIA MEDICA.

THE three main ideas which have revolutionised medical science since the middle of last century are those of the infective cause of disease, internal secretion, and accessory food factors. As a consequence, therapeutic interest has shifted to some extent from the older drugs of the pharmacopœia to sera and vaccines, hormones, and vitamins, and these now constitute an important part of the modern materia medica. While it is possible to disagree with Dr. Burn's view[1] that insufficient attention is paid to them in the teaching of pharmacology to medical students, everyone will concur in his statement that the newer knowledge finds almost no place at all in the teaching of pharmacists. To remedy the defect, he gave a course of lectures to members of the Pharmaceutical Society in London, and these lectures are the basis of his new book. The reader must not expect, therefore, to find a discussion of all the recent advances in materia medica, but he will enjoy a lucid account of those

[1] Recent Advances in Materia Medica. By J. H. Burn, M.A., M.D. Cantab., Director of the Pharmacological Laboratories of the Pharmaceutical Society of Great Britain. London: J. and A. Churchill. 1932. Pp. 224. 12s. 6d.

made in the field which is being most actively cultivated at the present time. The book is intended primarily for pharmacists, but the medical student and practitioner will find in it much information difficult to obtain in any other single volume. He will read of the methods of preparation and of the principles which underlie the action of antitoxins and vaccines; he will find a well-balanced account of the action and uses of the internal secretions, including those of the sexual glands and the anterior lobe of the pituitary; and he will learn something of the great expansion of knowledge of accessory food factors.

CLIMATE, DISEASE, AND FERTILITY.

THE enervating effect of tropical climates on people from temperate zones is well known, and Dr. C. A. Mills [1] thinks their condition is due to the monotony of unchanging good weather. Activity and achievement may thus be less a question of racial character than of fluctuations of climate, and he has set out to inquire whether there is evidence that a bracing climate may over-stimulate certain members of the population to the point of breakdown. As indications of the incidence of such breakdown he has taken the death-rates from exophthalmic goitre, pernicious anæmia, and diabetes, which he classifies as exhaustive diseases. This is to assume a great deal at the outset. The ætiology of these diseases is obscure, and there is no strong case for regarding them as being due to exhaustion rather than to any other cause. The suicide-rate, which he has taken as an indication of the incidence of mental failure, seems to be a less equivocal criterion, though it is hard to believe that climate is the only, or even the chief, factor affecting it. He is able, however, to show a definite correlation between the death-rates from these four causes and temperature fluctuations in different regions of North America. Storms appear for the most part in the north-west of the continent and sweep across the central States, and finally east across New England. Storm frequency is greatest from the Great Lakes area eastward up the St. Lawrence River, but much wider ranges of temperature accompany the storms near their point of origin in the north-west, while from the Great Lakes eastward the temperature changes diminish in amplitude. It is found that the death-rate from diabetes is highest in the west central States and follows quite closely the temperature variability, while the death-rate from exophthalmic goitre shows an even closer correlation with temperature fluctuations, and the distribution of deaths due to pernicious anæmia is much the same.

Dr. Mills goes on to say that a similar geographical difference in severity is associated with leukæmia, heart disease, arterio-sclerosis, angina pectoris, and chronic nephritis, which he classifies as not due to infection—another unproved assumption. He finds that the southern States show a low death-rate from these diseases, and that the area of greatest severity nearly always coincides with the maximum temperature variability. His argument is strengthened by the fact that the total death-rate is lowest where the death-rate from metabolic diseases is highest. The suicide-rate also appears to follow the greatest fluctuations in temperature, except in Florida and the Pacific coast; here the suicide-rate and the death-rates from metabolic diseases are high though this region shows neither high storm frequency nor high temperature variability. At this point Dr. Mills deserts his argument for a fresh one; he quotes the work of Ellsworth Huntingdon and himself to show that human efficiency and productivity are highest in areas where the mean temperature is near 64° F., a condition which applies to the Pacific coast, and ascribes the high incidence of metabolic diseases and the high suicide-rate in this region to a climatic drive applied throughout the entire year with no depressive periods to counterbalance it. Though the correspondence between variability of climate and the death-rates from the causes indicated is suggestive it seems scarcely justifiable to draw any decided conclusions from it. There might be a dozen factors besides climate which could be shown to vary to some extent with the incidence of the diseases chosen, and to regard any one as the responsible factor without further evidence is rather like saying that because cancer and the consumption of tomatoes are both on the increase, tomatoes must be the cause of cancer.

A second investigation [2] by Dr. Mills into the relation between sexual activity and climate is, perhaps, less open to criticism. He finds that the peak of fertility in married women in America is occurring at earlier and earlier ages, and that there is a progressive decline in fertility after 30 years of age; in the south fertility is initially less, but is more sustained, than in the north, and results in greater total productivity. He has also collected evidence to show that a change to an earlier age of onset of menstruation is taking place, and that this change is progressing more rapidly in the northern area of high storm frequency than in the south. He draws attention to the important social applications of these facts: with the peak of fertility and sexual activity coming earlier and the age at the time of marriage changing in the opposite direction, birth control will soon be unnecessary to curb over-population. At the same time the social and sexual problems of unmarried girls are being intensified, and he commends this to the recognition of workers in the social sciences.

[1] Amer. Jour. Hyg., March, 1932, p. 573.

[2] Ibid., p. 593.

FASCIAL PLANES.

FOR some years there has been a tendency among English anatomists to lay less stress on the various layers of fascia which their precursors dignified with elaborate description and many names. They are inclined rather to look on such layers as actually non-existent and to consider the several muscles and vessels and nerves as lying in a bed of areolar tissue, which only falls into layers round them when cut into by a knife. This does not apply, of course, to those true strata which contain a basis of aponeurotic fibres. The practical value of fascial layers remains, for it matters little if the division is made by a knife or by a purulent or hæmorrhagic effusion, and the surgeon is always preceded by a knife in the locality under investigation of these planes. This conception of fascia, however, admits of many descriptions, differing, but of equal value, because the result attained by the dissector will vary in detail according to the methods or preconceptions of any particular worker. Dr. B. B. Gallaudet, of Columbia University, has brought out a small book on fascial planes particularly in the abdomen, pelvis, and perineum.[3] He has studied the fascia in some 34 bodies during the last 17 years. He gives detailed accounts, which differ in many ways from the usually accepted ideas, but in spite of his

[3] A Description of the Planes of Fascia of the Human Body. By B. B. Gallaudet, Department of Anatomy, Columbia University, New York. Columbia University Press and Humphrey Milford, Oxford University Press. 1931. Pp. 75. 14s.

patient research seem to us to exemplify only another and more complicated variety of the personal descriptions which our conception of fasciæ invite. Readers may find the descriptions difficult to follow, but those whose work lies largely in relation with the pelvic floor may be encouraged to make the attempt; they will at any rate see that there are more ways than one of looking at any object of interest.

A paper by Dr. J. W. Davies,[4] dealing with the surgical applications of fascial arrangements in the abdomen and pelvis, provides some illustration of what has been said. There is nothing that is not true in this author's ideas, save the idea itself, and the same may be said about the notions of Mundinus and of a multitude of writers since. The idea, to our mind, is wrong because it is artificial. Schematic renderings and analogies, useful enough for aiding comprehension, do not constitute anatomy. It would seem to us to be a truer description of the connexion of the vagina, for example, to talk of this organ as lying in the well-developed pelvic subperitoneal areolar bed, and thus connected with the levator—and, by the way, the vagina is in direct relation with the levator laterally as far as the fornix. Areolar tissue is always thickened round vessels, and the vagina presents no exception in this way. We could have no particular objection to the plan, as a plan of arrangement, advanced by Dr. Davies, but we cannot help feeling that a better notion of actual conditions can be obtained by adopting an anatomical outlook based on the ideas mentioned above.

AMBLYOPIA OR FATIGUE?

In Dr. Stutterheim's paper on p. 774 of this issue amblyopia is defined as "partial loss of sight devoid of ophthalmoscopic or other marked objective signs," and he claims to have cured many cases of amblyopia associated with weak converging power by treatment by means of prisms calculated to increase the power of the converging muscles. The claim is novel and before admitting it, it may be well to examine the term "amblyopia" more closely. Toxic amblyopia may conform to the above definition but depends on well-known definite causes which point to the necessary treatment. Amblyopia ex anopsia applies, as a rule, to a squinting eye in which although the retinal apparatus may be perfect the power to interpret the retinal image has never been properly developed. It also applies to some cases of congenital cataract in which operation is deferred until after the age at which the power of interpreting the retinal image is normally acquired. Now it is well known that with equally perfect retinal apparatus the power of interpreting the retinal image varies greatly in individuals. The countryman can see many things in the landscape that entirely escape the observation of the visitor from town. The student can read fluently what the hand worker will stumble over, and it is seldom that small children who have recently acquired the art of reading can make out the bottom line of the distant test type, even though their refraction is normal. The difference is not in visual acuity, but in power of interpretation. Even in the same individual this power may and does vary from time to time, and the same conditions which cause weakness of convergence in anyone who is run down in general health are also liable to affect his mental alertness so that at one time he may be able to read 6/6 with ease and at another time not. We would suggest to Dr. Stutterheim that the term amblyopia is hardly a suitable one for a psychical condition that affects both eyes, and that any measures that produce an amelioration of this condition are effective not so much through the muscles as the mind. Mental fatigue may cause weakness of convergence, and any measures successful in curing weakness of convergence may react favourably on mental fatigue.

[4] Surg., Gyn., and Obst., March, 1932, p. 495.

PAPULAR URTICARIA.

Dr. Rupert Hallam's original observation that hospitalisation in itself is usually sufficient to cause a temporary clearance of papular urticaria (lichen urticatus) has been confirmed by other workers. Since he recorded this interesting fact, four years ago, he has discovered that he can get the same result if the affected children are detained for the nights only, and he now records[1] 11 cases in which no new lesions appeared so long as the patient slept at hospital. The cause therefore appears to have been narrowed down to something which operates during the nights under home conditions. Experiments with bedding, and the like, which was transferred to the hospital, were negative. A similar peculiarity of apparent reaction to home environment has long been known in the case of a much more serious disease—Hebra's prurigo. In this condition the extensor surfaces are covered with intensely irritable papules, and there is usually enlargement of the inguinal and axillary glands. Even in its most severe forms (prurigo ferox, limited to boys and young men) simple hospitalisation has often initiated a clearance, if not a cure. In his summary Dr. Hallam concludes that papular urticaria is an allergic manifestation to an undiscovered antigen which is not a food factor but is probably associated with the home sleeping arrangements. The disease is relatively common, accounting for 20 per cent. of all cases in some years in the skin departments at the Great Ormond-street and East London Hospitals for Children. The actual cause is therefore of considerable importance, and every dermatologist appreciates Dr. Hallam's careful work and observation and will wish him eventual success.

[1] Brit. Jour. Derm. and Syph., March, 1932, p. 117.

THE REVOLUTION IN SANATORIUM TREATMENT.

At the beginning of the century sanatorium treatment was distinguished by its elemental simplicity. Plenty of fresh air, of food, of rest—that was all. The successes achieved proved how much we starve ourselves of these elementary requisites under modern conditions. It was, however, difficult to be complacent over these results, for no satisfactory reply could be found to the criticism that many of the patients cured by sanatorium treatment would have recovered without it, and that the sanatorium did little or nothing permanent for patients in the second and third stages of tuberculosis. This criticism is, indeed, so pertinent that it might by now have greatly discredited sanatorium treatment as a whole had not the Forlanini revolution intervened. It is necessary only to compare the sanatorium reports 30 years ago with those of to-day to gauge the extent and effects of this revolution. The report for 1931 of the late Prof. Saugman's sanatorium at Vejlefjord in Denmark shows how variedly surgical the treatment of pulmonary tuberculosis has become. In this year there were discharged 138 patients who had suffered

from active pulmonary tuberculosis. Only 13 were in the first stage of the disease; as many as 88 were in the third stage. Yet, 119 of these patients were discharged cured or improved. Of 104 sputum-positive patients as many as 42 became consistently sputum-negative. Of the 60 who were febrile on admission, 43 were discharged as afebrile. As many as 27 suffered from tuberculosis of the larynx as well as of the lungs. The list of surgical interventions is impressive, not only by virtue of numbers, but also of variety. As many as 69 out of the 138 patients were selected for pneumothorax treatment, which, however, did not prove feasible in 29 cases because of pleural adhesions. Phrenico-exairesis was performed in 25 cases, total thoracoplasty in 6, partial thoracoplasty in 30, supplementary thoracoplasty in 2, simple thoracoscopy in 3, thoracoscopy with cauterisation of adhesions in 13, simple thoracocentesis in 4, thoracocentesis with air substitution or pleural irrigation in 21, Bühlow's drainage in 3, oleothorax in 9, and galvano-cauterisation in 36 cases. Sanocrysin was given to 43 patients, universal carbon arc light treatment to 46, this treatment being supplemented by local quartz light treatment in 5 other cases. About 25 patients enjoyed sun- and sea-bathing in the summer. Only 31·8 per cent. of all the sputum-positive patients treated during the 31 years of the sanatorium's life became sputum-negative, whereas in 1931 40·4 per cent. of the sputum-positive patients achieved this result. Judged by various other criteria, the results of sanatorium treatment at Vejlefjord were much better in 1931 than in the aggregate; and this result is the more striking because the diagnosis of pulmonary tuberculosis is nowadays made to depend on very definite signs.

It is encouraging to find Prof. Saugman's successor, Dr. J. Gravesen, continuing to set the pace in the sanatorium world.

THE HÆMOPOIETIC FACTOR IN GASTRIC JUICE.

WE commented last week upon the growing importance of gastric physiology to hæmatology. Dr. J. F. Wilkinson and Mr. Louis Klein, Ph.D., in the same issue described a method for extracting a hæmopoietic factor from stomach which appeared to differ from that found in liver and which they suggested should be called "hæmopoietin." A preliminary report from a group of workers in Cincinnati now adds further to our knowledge of the part played by gastric secretion. Morris and his associates[1] have found that normal gastric juice, after neutralisation, can be given by intramuscular injection to both animals and man without any serious reaction. A negligible reticulocyte response followed the injection of 10–20 c.cm. of such juice, but after concentration by vacuum distillation at a temperature below 40° C. a highly potent product was obtained. Ten hours after the first injection of a concentrate from 450 c.cm. of normal gastric juice there was a reticulocyte response up to 5 per cent., and 36 hours after, a level of 17·6 per cent. was reached, the initial red cell count being 2,100,000 per c.mm., which suggests that the material was of satisfactory potency. "Addisin," after Thomas Addison, is proposed as the name for this effective factor which it is suggested is probably an internal secretion of the stomach. This would account for the poor results obtained by administering gastric juice by mouth. Gänsslen[2] and Wilkinson and Klein have also reported satisfactory results from the parenteral administration of stomach preparations. The relationship or possible identity of hæmopoietin, addisin, and Castle's intrinsic factor remains undetermined.

[1] Morris, R. S., Schiff, L., Burger, G., and Sherman, J. E.: Jour. Amer. Med. Assoc., March 26th, p. 1080.
[2] Gänsslen, M.: Verhandl. d. Deut. Ges. f. inn. Med., 1931, xliii., 85.

CURABILITY OF CANCER OF THE STOMACH.

Dr. E. B. Benedict has produced a paper[1] which may usefully be read in conjunction with those of D. C. Balfour and others reviewed in our annotation of March 26th. He describes a group of 29 cases of gastrectomy, in only eight of which the patient survived operation by a year or more. The average duration of symptoms was nine months, but in six of the eight surviving cases the history covered less than five months. In view of the importance of early diagnosis, Benedict, too, emphasises the necessity of early gastro-intestinal radiography. The operative mortality is high, 48 per cent. of the patients dying within a month. In studying the pathology large longitudinal sections were made, and 290 lymph glands were examined. Benedict does not agree with Balfour about the value of the grading of the tumours in prognosis, and has abandoned it because of the difference in types of tumour encountered and the structural variation of different parts of the same tumour; he further describes three cases in which the clinical results would not bear out the histological findings if grading were attempted. The lymph glands were involved in 17 cases as follows: subpyloric, 11; lesser curve, 10; greater curve, 6; retropyloric, 5; and cœliac, 3. Of the eight cases which survived 12 months or more, in six the lymphatic glands were found to be not involved. The size and macroscopic appearance of the glands cannot be relied on to indicate malignant involvement

JEFFERY MARSTON.

THE interesting account of undulant fever which appears in this issue of THE LANCET from the pen of Sir W. Dalrymple-Champneys opens with a reference to the late Surgeon-General Marston's recognition that "Malta fever," as it was then called, was a clinical entity. There are old readers of THE LANCET who may still recollect the distinguished officer in question. Marston was for many years our adviser on medico-military subjects, and was qualified in a very complete manner to give us that assistance. As a young man he had been secretary to the P.M.O. in India; he prepared the schedule of field organisation for the Afghan War 1877; in 1882 he was sanitary officer to the Egyptian Expedition; and he was later head of the statistical and sanitary branches of the Army Medical Board. In 1888 he was P.M.O. of the British Forces in Egypt and was responsible for the medical arrangements at Suakim, and on his retirement from the Service he was appointed president of the Army Sanitary Commission and a member of the Indian Medical Board. His retirement from active service coincided with the breakdown in health of James Wakley, the second editor of THE LANCET, and it was to Marston, in particular association with the late Dr. James Grey Glover, that James Wakley turned for assistance in the conduct of this journal for a long period.

WE regret to announce the death in his forty-fifth year of Dr. Alexander Lewis Urquhart, professor of pathology in the Egyptian University, which occurred on March 28th in Cairo.

[1] Edin. Med. Jour., April, 1932, p. 263.

SPECIAL ARTICLES

UNDULANT FEVER.

A CLINICAL REVIEW.*

BY SIR WELDON DALRYMPLE-CHAMPNEYS, BT., M.D., M.R.C.P.,

A MEDICAL OFFICER OF THE MINISTRY OF HEALTH.

THE identification of undulant fever as a clinical entity is due to Marston who, in the Army Medical Report for 1861 (published in 1863), sorted out, with remarkable clinical acumen, from the rubbish-heap of the continued fevers of the Mediterranean area, a disease which he named "Mediterranean or gastric remittent fever."

In 1886 the causative organism was discovered by Sir David Bruce, and was named by him the *Micrococcus melitensis*. It has since been renamed the *Brucella melitensis* in honour of its discoverer, the brucellæ being now recognised as a separate genus, of which *melitensis*, *paramelitensis*, *abortus*, *para-abortus*, &c., constitute species or more likely varieties or strains of a single species. In 1897 Hughes published a classical monograph on the disease which gives a clinical picture of the Mediterranean type which has never since been equalled. We come next to the famous British Commission on Mediterranean Fever formed under the auspices of the Royal Society in 1904 with the coöperation of the War Office, the Admiralty, and the Civil Government of Malta, and with Colonel (afterwards Sir David) Bruce as chairman. On June 14th, 1905, Dr. Zammit, a member of the Commission, found that the blood-serum of five out of his six experimental goats (which had *not* been artificially infected) agglutinated the *Micrococcus melitensis*, and a week later Major (now Sir William) Horrocks found the organism in large numbers in the milk of a naturally infected goat. That this was the chief source of undulant fever among the forces of the Crown in the Mediterranean was soon proved by the virtual suppression of the disease among these men following an order forbidding the consumption of unboiled goat's milk.

The next event to which I would draw attention was the discovery by Kennedy in 1914 of the presence of agglutinins for *Micrococcus melitensis* in the milk and blood-serum of cows in London, an observation confirmed by other workers but for long lost sight of owing to the war. In 1918 fresh light was thrown on Kennedy's observations by Alice Evans in America, who made the illuminating discovery that the *M. melitensis* was very closely related to the *Bacillus abortus*, shown by Bang in 1897 to be the cause of contagious abortion in cattle. From this time onward progress has been rapid, and cases of undulant fever due to one or other member of the genus brucella and confirmed by positive blood cultures, or more often only by agglutination tests, have been reported from all over the world, not excluding this country. In most of the cases occurring elsewhere than in the Mediterranean area the infection has been acquired from cattle chiefly through their milk.

UNDULANT FEVER IN ENGLAND AND WALES.

When I wrote my report on this disease for the Ministry of Health in 1929, only 14 cases of endemic origin (excluding laboratory infections) had been reported in this country. Since then accounts have been published of 14 other cases in England and Wales and 3 in Scotland, and I have received details of 18 additional cases in England and Wales and 1 in Scotland, most of which I have seen, in which the diagnosis was, in my opinion, certain, but accounts of which have not so far been published. This total of 50 cases is, of course, a small one, but I am more than ever inclined to the belief, which I expressed in 1929, that a considerable number of undiagnosed cases occur each year in this country. The experiences of Denmark will perhaps suffice to illustrate the reasonableness of my apprehensions.

Before April, 1927, the presence of human undulant fever in Denmark was quite unsuspected, though contagious abortion in cattle was known to be widespread, as it is in this country. By Dec. 1st, 1928, as the result of the routine testing of Widal bloods for brucella agglutinins in the State Serum Institute at Copenhagen, 500 cases had been discovered, each with an agglutination titre for *B. abortus* of at least 1 : 100, and with the clinical characters of undulant fever. Fresh cases have been reported from Denmark at a corresponding pace ever since, and the United States, Canada, Sweden, Poland, Switzerland, Germany, Holland, and other countries have made similar discoveries though only the United States has experienced an incidence as heavy as that of Denmark.

Kristensen's comment on his Danish cases is worthy of serious attention. He says:—

> "As the presence of abortus bacillus infection among human beings was quite unknown in this country until these examinations took place, there is no reason to suppose that this infection has been especially frequent within the last few months. What has happened is that some of the feverish infections which previously had either not been diagnosed or wrongly diagnosed, were now correctly diagnosed. There is no reason to believe that this infection is more widespread here in Denmark than in countries where cattle breeding is carried on to the same extent; it must be supposed that if systematic enquiries of a similar nature were set on foot in Germany and in England the same conditions would be found."

In Germany such inquiries have been carried out since then (though in that country serological work is not centralised to the same extent as in Denmark), with the result that between Oct. 1st, 1929, and August 30th, 1930, 626 human cases of *Br. abortus* infection were diagnosed. In this country a slowly increasing interest is being taken in the disease, but systematic investigations on a large scale have not been carried out, and I find in my travels over the country that only a small proportion of our profession is alive to the possibility of brucella infections among their patients, and that even in pathological laboratories the examination of Widal bloods for agglutinins for this group is quite infrequent.

CLINICAL.

A great deal has been said and written about the clinical differences between undulant fever of the Mediterranean type, due to infection with the *Br. melitensis*, and the type which is now much more common and widespread, and which is due to the *Br. abortus*. However, the more I read the old descriptions and the more cases I read about or see, the less value do I attach to these distinctions. In illustration of my point I may quote the beginning of Marston's original description of "Mediterranean or Gastric Remittent Fever."

* Abridged from a paper read before the Paget Club, St. Bartholomew's Hospital.

He says :—

"By this is meant a fever characterised by the following symptoms and course: A preliminary stage of subacute dyspepsia, anorexia, nausea, headache, feeling of weakness, lassitude, and inaptitude for exertion, mental or physical, chills, muscular pains; lastly, a fever, having a very long course—three to five or ten weeks—marked by irregular exacerbations and remissions, great derangement of the assimilative organs, tenderness in epigastric region, splenic enlargement, slight jaundice without any exanthem. Neither bronchitis nor diarrhœa as a rule. The patient is prone to relapses and the disorder is followed by a protracted convalescence and a chloro-anæmic aspect. . . . There is no fever so irregular as this in its course and symptoms."

The last sentence is particularly noteworthy. The great irregularity will often suggest the diagnosis and, if borne in mind, will often save us from a rash prognosis.

The above word-picture of undulant fever was drawn by the master hand of one who alone had the vision to distinguish in the fog of the remittent fevers the clear-cut features of this formidable enemy of mankind.

From this point I shall speak of the disease chiefly as occurring in this country. Undulant fever is commoner in males than in females (of the cases in Great Britain 33 were males and 11 females), and most often attacks those between the ages of 15 and 45. It is very uncommon in children under 5 years, but the English cases include a boy of 3½ years and an infant of 20 months. The incubation period is probably from 3 to 14 days, but the usually gradual onset makes it very difficult to determine. Though the onset is usually gradual, this preliminary stage may be terminated by a sudden and considerable rise of temperature with an exacerbation of symptoms. Cases with a *really* sudden onset, without any preliminary stage, are very rare, but the type of case in which no abrupt transition occurs is comparatively common, and in these there is sometimes discernible a gradual increase of severity to a maximum followed by a gradual amelioration of symptoms. The "great derangement of the assimilative organs" described by Marston has hardly ever been observed in this country, but anorexia is nearly always present. On the other hand, bronchitis, which was very uncommon in the Mediterranean, is not infrequently present here, though in a mild degree, sputum being almost always absent and definite physical signs in the chest being difficult to detect.

The most striking feature of the disease is the behaviour of the temperature. In spite of the extraordinary variations observed in different cases and in any one case, there is something about these temperature charts which experience enables one to detect as being characteristic of this disease.

For the sake of clearness I propose to divide the temperature charts into three types, but it should be clearly understood that often all types are seen at different stages of the same case, and few charts are quite characteristic of their type throughout the course of the disease. The first and most frequent type of chart usually begins "in the air," that is to say, at the time when the temperature is first taken it is found to be anywhere between 100° and 106° F., though the history makes it probable that the temperature has been raised for some days or weeks before this. In this type, first described by Hughes, and the frequency of which made him suggest the name of "undulant fever" for the disease, the temperature chart shows a number of waves, lasting usually for about a week, and connected by comparatively flat troughs which are often situated some way above the normal line.

The waves are not constituted by a simple curve but are composed of a number of zigzags, each usually representing one day's record. And this brings me to the two most characteristic features of these charts, which are seldom absent throughout the course of a case of any type—namely, (1) the afternoon or evening rise, followed by a fall in the night or early morning; and (2) the sudden big swings, a drop of 4° or 5° in an hour being not at all uncommon. I must here mention an important symptom which is not included in Marston's description of the disease, but which he does not fail to note elsewhere—namely, the heavy sweats which usually accompany these sudden falls of temperature. These sweats are often literally "drenching," and sometimes (though not as often apparently as in the Mediterranean region) they have a peculiar sour smell, which is so characteristic that a physician well acquainted with the disease will detect a case in his ward the moment he enters it. Relapses are common in this variety of the disease.

To return to the temperature charts, the second type, called by Hughes the intermittent type, shows a less intense but more hectic fever with less tendency to relapses and fewer and milder symptoms.

The third type of chart is the completely irregular and this may be found in the mildest or most severe cases of the disease. In this type the temperature wanders along with rises or falls at irregular intervals and of irregular duration, the temperature sometimes rising swiftly to a peak, from which it may descend with much greater caution, or suddenly plunging into an abyss only to rise as suddenly a few hours later to its former level. These wild excursions break the monotony of an extensive plateau or interrupt unexpectedly the even level of a peaceful plain. In spite of this tendency to extreme irregularity these charts seldom fail to display at some point in their course the evening rises followed by morning falls which are so characteristic.

One phenomenon which cannot fail to strike the observer is the extraordinary discrepancy between the height of the temperature and the general condition of the patient. In no other disease with which I am acquainted does the patient emerge from a prolonged and severe struggle against fever with so few evidences of the battle detectable. This anomaly constitutes in some cases a valuable aid to diagnosis.

I may here mention that the occurrence of abortion in women due to infection with an organism of the brucella group is now proved, and the causative organism has been recovered in several cases from the vaginal discharge, from the placenta, and from the fœtus.

The duration of the disease is very variable. It seldom lasts less than three weeks, more often six weeks or two months, and many cases are on record which lasted one or two years. A lady, in whose case I have been interested and in which the diagnosis is beyond doubt, has been familiar with her present symptoms since 1886! I cannot give you the average duration of the English cases, as some of them are still ill, and of the termination of other cases I have not yet received information, but the average duration of the disease in Hardy's series of 95 recovered cases observed in the State of Iowa, U.S.A., was 15½ weeks.

There is no doubt that the *average* severity of cases infected by the *Br. melitensis* is greater than that of abortus-infected cases, and the same difference is usually reflected in the mortality-rates. Hughes

gives the mortality of the Mediterranean cases as 2 per cent., whereas in Zeller's series of 626 German cases it only amounted to 0·6 per cent. On the other hand, Bierring reports a mortality of 2 per cent. among 150 cases in Iowa, but it must be remembered that in that State infection with the virulent porcine strains of abortus is common.

DIAGNOSIS.

Clinical.—I have already spoken of the clinical diagnosis when treating of the symptoms, so I will confine myself to reiterating the most helpful points, viz.: (1) The character of the temperature chart. (2) A symptom complex, including lassitude, headache, anorexia, and heavy sweats. (3) Prostration not nearly so severe as would be expected from the temperature.

Laboratory.—Positive agglutination to a titre of at least 1 : 100 is nearly always present, and tremendously high titres, which can be higher than in any other disease—e.g., 1 in 20,000—are often found. Blood culture is not always easy with organisms of the *abortus* variety, but it is always worth attempting, even when the pyrexia is moderate. A positive urine culture is less frequently obtained. A relative or even an absolute lymphocytosis is very common, and some degree of anæmia is usually present except in very mild cases.

The diseases for which undulant fever is most commonly mistaken in this country are influenza, enteric fever, and tuberculosis.

TREATMENT.

At present the principal treatment is symptomatic. Pyramidon in grs. 5 doses is useful for headache and for combating insomnia. Aspirin and the other antipyretics should be used with great caution. They have no permanent effect upon the fever—though the characteristic evening falls and the sweats are often wrongly attributed to their exhibition—and they tend to increase the depression which is often a marked feature of the later stages of the disease.

There is no specific treatment for the disease. The intravenous injection of mercurochrome, trypaflavine, Bayer 205, &c., have been tried with very little success, and are by no means free from danger. Killed vaccines of *Br. abortus* occasionally appear to help, but in my opinion they are best restricted to the later stages when the temperature is not rising above about 100° F., but refuses to remain at normal or below. Spicer's Edwenil has occasionally appeared to produce good results, but its action is uncertain, and I have lately heard of unpleasant symptoms produced by it.

Two points with regard to diet. First, the patient should not be kept on slops one moment longer than can be helped. Unless the symptoms and signs point to marked digestive derangement he will manage light, solid, or semi-solid food remarkably well, and it will help him to fight his feverish bouts and to make a more rapid recovery. Secondly, he should not be given raw milk, even certified milk, since it may very well contain the organism he is trying to fight. Efficiently pasteurised milk is quite safe.

ÆTIOLOGY.

The more I have reflected upon ætiology the more formidable has the problem appeared.

First, I may recall Kennedy's discovery of agglutinins for the *M. melitensis* in the milk and blood-serum of London cows. Commenting on his findings, Kennedy remarked: "I think the possibility of a melitensis infection of cows in this country should not be lightly thrust aside. I have heard of two cases of undulant fever in people who have never been out of England, and it is possible there are others undiagnosed." If Kennedy had known the close relationship between the *M. melitensis* and the *Br. abortus* he would no doubt have made inquiries about those cows and would have found that contagious abortion was present in the herds. This disease of cattle is widespread in every dairy-farming country, and is the cause of enormous loss every year to cattle owners. As it is not a notifiable disease in this country no reliable statistics are available, but there is no doubt that the infection is present in at least 80 per cent. of the dairy herds in this country, and some veterinarians and farmers of experience believe that 80–90 per cent. of our milch cows are affected. This does *not* mean that 80–90 per cent. of the cows are excreting the organisms in their milk at any one time, but a cow once infected seldom or never gets rid of the infection, and the organisms are at any time liable to appear in the milk.

We have little information with regard to the degree to which market milk in this country is infected, but Wilson and Nutt examined 488 samples of cows' milk in Manchester by guinea-pig inoculation (the most reliable method), and found that 5·7 per cent. of single milks and 8·8 per cent. of mixed milks contained the *Br. abortus*. I cannot here discuss the interesting problem presented by the curious discrepancy between this widespread infection of our milk-supply (pasteurisation, by the way, kills the organism, but in the provinces most milk is not pasteurised) and the small number of human cases reported. The same phenomenon has been observed in many other countries. In Denmark and other great dairying countries human infection by direct contact with infected cattle is very common, and it is difficult to believe that the same is not true to a certain extent in this country. What we do *not* know at present is whether sheep, goats, pigs, and horses in this country are infected. In France sheep and goats are the chief sources of human infection, and in some parts of the United States porcine infection is presenting a serious problem.

MEDICINE AND THE LAW.

Broken Hypodermic Needle.

ON March 31st an inquest was held on the body of a Bayswater postman who had suffered from acute attacks of bronchitis and asthma and who had been gassed three times during the war. His medical attendant gave evidence that, at the last of a series of hypodermic injections in the chest, the needle broke. He knew the needle had broken in the patient's chest and he explained the danger; but the patient, whose heart was in an extremely bad condition and who had had little food or sleep for a long time and was exhausted, refused to allow the broken piece to be removed either at the time or on the following morning. Post-mortem examination revealed a slight mark on the lung where apparently the needle had penetrated. The pathologist who gave evidence of the result of the examination was asked by the coroner (Mr. Ingleby Oddie) what was the duty of the doctor when a needle breaks. The witness replied that the broken needle should be removed at once; "they move so quickly that you don't know where they are"; he would not expect

the needle to puncture the lung. The coroner, in returning a verdict of "Accidental Death," expressed his opinion that death was accelerated by the puncture of the lung. He added a rider that the needle should have been removed by the doctor who, he thought, had listened too much to the patient and not to his own sense of duty; "there are times when the patient's feelings should not dominate, and when it is the doctor's duty to insist." The medical practitioner whose conduct was thus reflected upon had already made it clear that he did insist and had fully appreciated the danger; but the patient had absolutely refused, saying that he wanted only to be let alone. Nobody suggested that the breaking of the needle was a negligent act; it was a mere accident, involving in itself no legal liability. While everyone will agree that a broken needle should be removed immediately, it is perhaps unnecessary to add that doctors have no power to compel a patient to undergo a surgical operation. A patient of mature age and of sound mind has the legal right to decide whether he will have a particular treatment or no treatment at all. No reflection whatever remains on the medical man.

Christian Science and Pulmonary Tuberculosis.

The patient's power to decide for or against medical treatment is illustrated afresh by a recent inquest at Battersea. A girl of 20, who had been for some months in a Christian Science nursing home at Harrow, had died of pulmonary tuberculosis. Giving evidence of the cause of death, Dr. Temple Gray said the girl had had the disease for about five years; had she had the usual hospital treatment early, there would have been the chance of a cure. Dr. Edwin Smith, the West London coroner, after opening the inquest on March 29th, adjourned it for a few days in order to obtain evidence of the treatment which the deceased had undergone. The superintendent of the Christian Science home at Harrow explained that the treatment consisted of prayer; the Christian Science visitor who had paid a daily visit to the deceased at the house in Putney where she died, gave the same explanation. A medical practitioner was called in about an hour before her death. The coroner asked whether this step was taken in order that a death certificate could be given. The suggestion was denied; the visitor gave the explanation that the other people in the house at Putney were not Christian Scientists and it therefore seemed fairer to them to call in a doctor. In answer to questions by the coroner, the Christian Science witness said that in cases of acute pain prayer could send away the pain and was in the witness's belief better for this purpose than morphia; in the case of bad teeth the patient would not be urged to see a dentist; a broken leg would have to be properly set by a surgeon, but scaldings or burnings would be left alone.

The jury found that death was due to general tuberculosis, accelerated by failure to obtain medical treatment. Their view, as elucidated by the coroner, was that somebody at some time should have intervened and insisted on proper medical treatment being given. Criminal neglect was not an element in the case, although, as the coroner pointed out, a finding of criminal neglect might have been justified if the girl had been a few years younger. She was, he said, little more than a child, and people should be careful not to impose their philosophies upon children. No doubt he had in mind Section 12 of the Children Act under which parents and persons in *loco parentis* are criminally liable for neglect if they wilfully neglect a child or young person by failing to provide medical aid. Apart from this provision of the Children Act, which applies only where the victim is under 16 years, there is a common-law liability on any grown-up person who, having undertaken the charge of a human creature helpless either from infancy, simplicity, lunacy, or other infirmity, allows that creature to die by wicked negligence. The deceased in the Battersea inquest case was 20 years of age and thus the Children Act was excluded; she also appears to have had strong views of her own and thus to have been far from helpless for the purpose of the common law. The coroner, however, was clearly obliged to make a full examination of the circumstances.

AUSTRALASIA.

(FROM OUR OWN CORRESPONDENT.)

PRESENTATION OF A MACE TO THE ROYAL AUSTRALASIAN COLLEGE OF SURGEONS.

An event of unusual interest took place at the fifth annual meeting of the Royal Australasian College of Surgeons, when Mr. C. H. Fagge presented a mace—the gift of the Royal College of Surgeons of England—to the Australasian College. The ceremony took place in the Wilson Hall of the University of Melbourne in the presence of a large assembly. After the meeting had been opened by the Lieutenant-Governor of Victoria (Sir William Irvine) and Mr. Fagge had been introduced by the President of the College, he formally presented the mace. "In the name and by the authority of the Council of the Royal College of Surgeons of England," he said, "I ask you on behalf of the Fellows of the Royal Australasian College of Surgeons to accept this mace, which my colleagues hope may remain throughout the existence of the two Colleges an emblem of the brotherly affection which binds us together."

Describing the mace, Mr. Fagge said:

"In designing the mace for the Royal Australasian College of Surgeons, Omar Ramsden has followed the general form and proportions of that of the Royal College of Surgeons of England, which was executed by His Majesty's goldsmiths. Of necessity the ornaments have been altered and appropriate emblems have been introduced.

"By express permission of His Majesty King George V. the finial is formed by the Royal orb and cross; these emblems are supported by four arms or buttresses suggesting the form of a monarchial crown, and on them is woven a border of briar symbolising the thorny path which leads to greatness. The four panels around the head bear the arms of the Commonwealth of Australia and of the Dominion of New Zealand, of the Royal Australasian College of Surgeons, and of the Royal College of Surgeons of England, between which are oak decorations emblematical of the permanence of the institutions just mentioned. Beneath the head, which, as is fit, is supported by eight British lions, is a wavy strip to symbolise the separating seas. The universal decorations are the rose of England, the seven-pointed star and wattle of Australia, and the fern of New Zealand; and the staff bears the names of the donors—the 24 members of the Council of the Royal College of Surgeons of England in the year 1930–31. The cap bears the Royal Arms, and round this is the legend that it is the gift of our college to yours 'as brothers to brothers.'"

In accepting the mace, Sir Henry Newland said: "As President of the Royal Australasian College of Surgeons, I accept with pride and gratitude this most beautiful mace; the generous motives and fraternal sentiments which prompted the gift have touched our hearts. This young College, looking beyond the seas for inspiration, finds it in the ideals and example of the Royal College of Surgeons of England. This College is anxious, too, that the good repute of surgery shall be maintained, and that in the practice of its art the feet of its votaries may not stray from the

path of honour. May the beauty of this mace strengthen our purpose to adhere to all that it symbolises."

Thirty-one new Fellows of the College were then presented to the President and formally admitted as Fellows. Mr. George Robert Adlington Syme was then presented to the President of the College and admitted as a Fellow. It was explained that he would not ordinarily have been admitted to the Fellowship until next year, but owing to the fact that this was the occasion on which the first annual oration, in honour of his father, the first President of the College, was being delivered, it was deemed fitting that he should be admitted then. Mr. Fagge then delivered the first George Adlington Syme oration, in which he reviewed the life and work of the late Sir George Syme and particularly the part he played in the formation of the Royal Australasian College of Surgeons. On the following day, the honorary degree of Doctor of Medicine was conferred on Mr. Fagge by the Senate of the University of Melbourne.

NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENT.)

CONTROL OF DRUGS IN INDIA.

THE report of the Drug Enquiry Committee has now been published, and its members, Colonel Chopra in particular, deserve congratulation on the promptitude with which they have produced an extremely comprehensive report; the interest in a subject is liable to die down if there is undue delay in publishing the findings. The report proper covers 170 pages, but its perusal is facilitated by a summary of the recommendations. The appendices, which cover another 250 closely printed pages, give the memoranda for which the Committee called and summaries of the evidence presented before them. The Committee recommend that control should be exercised over drugs, both those imported and those manufactured in India; that this control should be essentially a matter for the central government; that there should be a central laboratory in either Calcutta or Bombay, but in addition each province should have a laboratory in charge of a public analyst; that the provincial laboratories should test and report on drugs, other than biochemicals and organo-metallic compounds, submitted to them by the customs or other local authorities, or manufacturers; that the central laboratory should complement and supplement the work of the provincial laboratories, standardise methods of analysis for various climatic conditions and maintain stable standards, train analysts and carry out research work on indigenous drugs; that all manufacturers, importers, and traders in drugs should be registered; that government inspectors should be provided to collect samples for testing; and that legislation should be introduced regarding misbranding and adulteration of drugs. By way of financing these recommendations they suggested amongst other things *additional* import duties of 5 per cent. on all drugs, except crude chemicals, and of 20 per cent. on all patent medicines with undisclosed formulæ.

The Committee made a valiant effort to investigate the question of drugs used by the indigenous practitioners, the vaidyas and the hakims, but they found here such chaos existed that it was impossible to consider the inclusion of these drugs in any legislative measures to be recommended.

Their other proposals include some useful suggestion for the foundation of an organised and registered profession of pharmacy in India. At present there is little to prevent any totally untrained person dispensing and selling medicines or even taking up a post as dispenser in an institution. In most provinces there is no organised course of training for dispensers and in those in which this exists it is inadequate. They also urge the necessity for revising the present quinine policy and suggested that the possibility of producing a standardised cinchona-febrifuge which would be cheaper than quinine should be investigated.

TUBERCULOSIS.

Probably the most outstanding socio-medical problem of the day in India is pulmonary tuberculosis; furthermore it is one that is going to increase. History is, of course, repeating itself; while the more dramatic tropical diseases are being controlled by the efforts of the sanitarians and also by the increased urbanisation of the population, the latter is causing a serious rise in respiratory diseases, especially tuberculosis. The annual reports each year show more and more evidence of this. In Bombay, for example, the death-rate from tuberculosis is 1·1 out of a total death-rate of 21·2 per thousand. It is really more of a social than a medical problem and demands a revolution in the customs and habits of the whole population; especially those connected with purdah and housing.

RETRENCHMENT.

Medical research in India is coming into hard times. At the last annual research workers' conference the Director-General informed us that not only had the total research grant of 5 lakhs of rupees been cut, but in addition 1 lakh of the 2½ lakhs usually voted for the pay of permanent officers of the research department would have to be found out of capital this year. The research programme for 1932–33 had of necessity to be curtailed very considerably and a number of trained research workers dismissed. For a year or so, by drawing capital and exercising the strictest economy, the research fund will be able to carry on a modified programme, but unless the annual grant is soon restored all medical research work in India will cease.

The proposed Cholera Commission has been abandoned; this will be a disappointment to many people outside India who expect us to do something about the disease which, rightly or wrongly, they look upon as India's gift to mankind. Colonel F. P. Mackie, who was to have been in charge of this commission, has now retired, and we have thereby lost one of our ablest research workers. Colonel Mackie was one of the officers of the Indian Medical Service who joined Sir David Bruce's Sleeping Sickness Commission and during the last twenty years he has done valuable work in this capacity. His work in plague and sprue are well known. He was for many years Director of the Haffkine Institute in Bombay.

The All-India Institute of Hygiene was, as we foretold, not opened at the beginning of the year. The building was ready, but the Government, employing their usual dilatory methods, failed to sanction any expenditure so that no posts could be advertised. The Director-designate and his assistant are therefore in the position of administering one of the finest and best-equipped institutions in India, but one whose marble halls are entirely devoid of personnel. We now understand that financial sanction

for opening four out of the promised six sections has been given, but that there are other difficulties, such as the selection committee for the staff, to be overcome. In these hard times there is probably sound reason to encourage these dilatory methods. We hope that the Rockefeller Foundation is satisfied that the Government of India are keeping their promise in spirit, if not in deed.

ATEBRIN IN MALARIA.

At the Calcutta School of Tropical Medicine atebrin, a new antimalarial preparation allied to plasmoquine, has been given a trial. In the first eleven hospital cases in which it was used there was almost immediate clinical improvement and rapid disappearance of the parasites from the peripheral blood. Like quinine it does not destroy gametocytes, but when it is given in conjunction with plasmoquine all forms of parasite disappear. In over fifty cases in which only a four-day course of atebrin was given under field conditions, the recurrence-rate was only 14 per cent.; some of these recurrences will have been reinfections as the patients were living continuously in a highly malarious place. The introduction of a real rival to quinine may have far-reaching effects.

UNITED STATES OF AMERICA.

(FROM AN OCCASIONAL CORRESPONDENT.)

SUPRARENAL EXTRACTS.

IT is now 12 years since the "Muirhead régime" was inaugurated by Rowntree at the Mayo Clinic. Dr. A. L. Muirhead in spite of the treatment survived for less than a year, but the striking though temporary relief which he gained from the severe symptoms of Addison's disease encouraged further efforts. Rowntree continued the Muirhead régime (administration of adrenalin by hypodermic, rectum, and mouth to tolerance, and of whole gland or cortex by mouth) with temporary success in a little more than half the cases treated. Frank A. Hartman, of Buffalo, N.Y., in 1927 precipitated from a watery extract of suprarenal cortex with sodium chloride a substance which he named cortin. The method of extraction was modified in June, 1930, by the use of alcohol and ether. The first human case was treated with this extract on July 8th, 1930, and since then six other cases have been treated in Buffalo by Hartman and his colleagues. The report of these cases [1] makes as dramatic reading as anything in the history of insulin. Their third case, for example, had a crisis during the course of treatment. The patient lost consciousness, his muscles went into spasm. Heart sounds were inaudible and respiration ceased "for a time." This man, not many days later, was able to walk more than a mile at a time without fatigue on a daily dose of the extract of 1200 g. of cortical tissue.

Rowntree and Green, of the Mayo Clinic, have treated 22 cases of Addison's disease with an extract prepared by the method of Swingle and Pfiffner (extraction with alcohol and benzene). The immediate results were excellent in 17 cases, but six patients have died (three while under treatment) and three failed to respond to treatment. The same extract, prepared at the University of Colorado Medical School, has been used by C. F. Kemper and P. A. Dickman.[2] In one case the results have been satisfactory. In another the use of the hormone apparently reactivated old tuberculosis so that the advantage gained was largely neutralised.

The first attempt to produce the hormone on a commercial scale has not been very successful, but efforts in this direction are being continued.

[1] Jour. Amer. Med. Assoc., March 5th, p. 788.
[2] Colorado Med., 1932, xxix., 105.

CHILD GUIDANCE.

Sad news is the announcement of the Commonwealth Fund that, owing to the necessity for retrenchment, their support of the Child Guidance Institute of New York will be discontinued in 1933. In a sense, however, the institute has served its purpose. The value of child guidance work has been so thoroughly recognised that there are now 232 clinics in 34 States, most of them established during the last ten years. The high standards of the New York institute are reflected in these clinics all over the country. In addition to the 232 clinics above mentioned, each with the full team of psychiatrist, psychologist, and psychiatric social worker, there are 442 "mental hygiene clinics" with at least one psychiatrist in regular attendance. The total of 674 clinics served last year some 36,000 adults and more than 50,000 children. The National Committee for Mental Hygiene, which reports the above figures, finds that "public and private organisations, parents and teachers, physicians, judges, clergymen, social workers, all have recourse to the child guidance clinic for help in the solution of juvenile problems."

IRELAND.

(FROM OUR OWN CORRESPONDENTS.)

MENTAL TREATMENT BILL FOR NORTHERN IRELAND.

THE lunacy law in Ireland has for all practical purposes remained unaltered since the passing of the Act of 1875. The specialised treatment provided in public mental hospitals in Northern Ireland has been confined to persons definitely certified as of unsound mind, and has thus been denied to those who may be merely threatened with disease or who may be suffering from some temporary form of mental instability. The object of Part I. of a Bill, which has just passed its second reading in the Parliament of Northern Ireland, is to enable cases of incipient mental disease to be treated in mental hospitals without the necessity for certification and without the intervention of anything in the nature of judicial proceedings. Provision is made for voluntary treatment and temporary treatment. Part IV. of the Bill enables public mental hospitals to provide clinics at which extern patients may obtain advice and treatment, and which will also enable discharged patients to receive the same advantages. It is proposed to abolish certains terms which have hitherto been employed in mental illness and which have acquired a sinister and objectionable significance: "lunatic" will be replaced by "person of unsound mind," "lunatic asylums" by "mental hospitals," and "pauper" by "rate-aided person." With regard to admissions, it is proposed that persons of unsound mind may be received into a mental hospital on a simple order of a magistrate supported by a medical certificate. In cases of urgency the patient may be removed at once on the doctor's certification in anticipation of the justice's order. In such cases, however, the authority to detain the patient is limited to seven days, unless full procedure for admission has meanwhile been completed. In the discussion on the Bill it was suggested that homes should be established where patients could be taken

for treatment for a short period without having the feeling that they had been inmates of an asylum.

DUBLIN CORPORATION AND THE DUBLIN HOSPITALS.

In his financial proposals submitted to the Dublin Corporation the City Manager suggests the reduction by 50 per cent. of the amount of grants to such hospitals as are participating in the benefits of the Irish Hospitals Sweepstakes. He points out that the benefits received have been in fact far beyond all expectations. Last year the City Manager made a similar proposal to the Council, but the Council restored the full amount of the grants as in previous years. He asks the Council to consider the matter afresh this year.

SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

EDINBURGH BACTERIOLOGICAL SERVICES.

At present the bacteriological work for the public health department of Edinburgh is done in four different institutions: the University, the Veterinary Department, the Royal Infirmary, and the City Hospital. Dr. Guy, the M.O.H., suggests that it would be best that so far as possible the University bacteriological department should undertake the service in future. This step has already been taken to some extent, for the town pays the University £550 a year for general bacteriological investigations. The Veterinary Department has two sections; it does microscopical work for detection of diseases and parasites in meat, &c., and biological work, involving the use of animals. These latter are used chiefly for the detection of tubercle bacilli in milk. It is now proposed that the biological work should be transferred to the University. The public health bacteriological work at the Royal Infirmary is entirely confined to venereal diseases. This task was undertaken by the Infirmary in 1922, being previously performed partly by the Infirmary and partly by the laboratory of the Royal College of Physicians. During the first year (1923) the number of specimens examined was 21,000, and at that time the Board of Health considered a sum of £2000 a reasonable amount to be paid by the town for the service. But the number of specimens last year was 54,000 and the sum paid remains about the same. Without dislocation the work could be undertaken by the University, and the whole question has been remitted to a small sub-committee, including the professor of bacteriology.

Many years ago, when the City Hospital was opened, Dr. Claude Ker stood out for a laboratory there. This was so obvious a necessity that a laboratory was established, and it is always in active use.

HOMICIDE BY A FEEBLE-MINDED BOY.

A thirteen-year-old boy lately appeared before Lord Anderson in the High Court of Justiciary at Edinburgh on a charge of having struck a small girl with a hammer and killed her. Dr. Dods Brown, physician-superintendent of the Aberdeen Royal Mental Hospital, Dr. J. S. Annandale, medical superintendent of the Aberdeen County Mental Hospital, Kingseat, and Dr. W. M. M'Alister, medical superintendent of Bangour Village, all certified that he was so feeble-minded as to be unfit to plead. Dr. M'Alister said that his intelligence was that of a child of about 8. The Solicitor-General announced he had been in consultation with the proper authorities about the boy's future, and Lord Anderson pronounced an order for detention during his Majesty's pleasure.

EDINBURGH HOSPITALS FOR WOMEN.

Bruntsfield Hospital has been recognised by the Medical Research Council as a centre for research in the radium treatment of diseases of women, and this has enabled the hospital to obtain radon from the Middlesex Hospital, and thus extend the scope of the work. The Council has also granted the Hospital a loan of 125 mg. of radium.

At the Elsie Inglis Maternity Hospital, investigation of maternal morbidity was continued during last year. A total of 1320 confinements were attended—965 in hospital and 355 on the district—an increase of 201 on the previous year. The out-patient department, a steel-house, of the Weir type, was taxed to its utmost, 15,719 attendances being registered there, an increase of nearly 2000. This was due to the growth of antenatal and postnatal clinics. The postnatal attendances were particularly gratifying, and the "follow-up" which was done there was of great value to both mothers and babies. In connexion with the 1320 confinements, there were only two maternal deaths, and the morbidity-rate was 3·8 per cent. This low rate is attributed to the special preventive technique which has resulted from the research carried on at the hospital during the last two years. In the extra nursery accommodation provided there is a Morgenthaler bed for premature or delicate infants, the only one of its kind in the country.

BUDAPEST.

(FROM OUR OWN CORRESPONDENT.)

A MEDICAL STRIKE.

Seventy assistant physicians, junior surgeons, and dressers, all employed by the dispensaries of the Jewish hospital, have refused to continue their hospital duties because the Board of the Jewish community, which maintains the hospital, refused to grant them even a modest salary. The Board argued that, in the present critical economic circumstances, when they have a tremendous deficit, it is impossible to encumber their budget with new expenses. Besides, doctors regard these posts as merely temporary, filling the gap between studenthood and private practice; apart from assistants employed in the hospitals, the rest are occupied in three out-patients' departments, working in various districts of Budapest. Furthermore, the Board established these posts directly for young Jewish physicians, to give them the chance of hospital experience, for until quite recently the municipal hospitals of the city, which are in a position to give work to hundreds of young doctors, did not employ Jews as assistants or junior dressers. The "strikers" put their case before the directors of the Hungarian Medical Association, which forbade its members to accept any unpaid appointment, and for the time being the directors regarded these posts as subjects of *carete*, so that anyone who dared to take them would be unrecognised by the profession. At the same time they started negotiations with the Board of the Jewish community, but the latter, adhering to their resolutions, pointing to the miserable state of their community, more than 30 per cent. of its members being unable to pay their ecclesiastical taxes. The director of the hospital has appointed a small number of physicians-in-chief to attend the out-patient departments—all of which

give purely gratuitious advice and treatment—restricting their services only to very serious cases.

LEGAL STATUS OF CURED GENERAL PARALYTICS.

At a recent meeting of the Medical Society Dr. Bla Joó said that general paralytics; even in the state of complete remission following pyrexial treatment, may display greater or less defects. These are manifested not only by decrease of intelligence, but chiefly by change of character and efficiency. Hence sufferers from G.P.I. must not be treated by the law as if they were normal beings in the same state as they were in before their illness. From the point of view of criminal tendencies, patients even with the most complete remission have to be regarded as unaccountable for their deeds, and should they err against the law, they should be isolated and placed under observation. Joó thinks that from the point of view of private rights, their ability to take action may be legally recognised with certain limitations, but he emphasises that every single case requires individual consideration. Officials in responsible posts who become general paralytics should be pensioned, and no one in this condition should be in a position where his errors may cause to others moral or material damage.

COHABITATION AND POST-PARTUM INFECTION.

Dr. Jànos Batisweiler, of Budapest University, has reported the following case :—

A primipara, aged 28, was admitted to the First Gynæcological Clinic on Oct. 24th, 1930. She left the clinic after 12 days with a completely healed vagino-perineal wound and a well involuted uterus. She felt quite well for two days after leaving hospital, but on the third day had sudden hæmorrhage. On Nov. 21st she was taken back to the clinic, where she died on the thirty-sixth day after delivery. The diagnosis on her readmission to the clinic was thrombophlebitis septica. From the clinical manifestations it was concluded that the cause of this condition was an infection which took place after she left the clinic. At the post-mortem examination the director of the clinic called the attention of the pathologist to the fact that very probably the septic infection had been provoked by cohabitation, traces of which could be found at the autopsy. Besides micro-organisms, the uterine cavity contained sperm cells. Thus the source of the infection was obvious, and the sudden hæmorrhage on the fourteenth day after parturition was explained as the result of the cohabitational insult.

This case is the first case in which the rôle of cohabitation is definitely established in the ætiology of puerperal sepsis, and it also teaches us that spermatozoa may live as long as three weeks. Batisweiler in his review of the subject reaches the following conclusions: (1) Coitus may cause hæmorrhage and abortion in the first half of pregnancy, and it is therefore advisable, especially in the case of primiparæ, to abstain from coitus for at least three months after conception. (2) In the second half of pregnancy, extreme, exaggerated sexual life may cause mishaps such as miscarriage or premature labour. (3) About the end of gestation, that is, in the last three to six weeks, early rupture of the chorion, infection, and puerperal fever may be the result of cohabitation. The only possible rule is strict abstinence in the last six weeks. (4) Sexual life should not be resumed until at least a month after delivery.

PANEL AND CONTRACT PRACTICE

INCREASED SICKNESS CLAIMS, ESPECIALLY AMONG WOMEN.

AN address delivered from the chair by Mr. Henry Lesser, at the recent annual meeting of the National Federation of Employees' Approved Society, and some remarks made by the deputy controller of the Insurance Department of the Ministry of Health at the luncheon which followed, have again brought into prominence the sickness claims of women, and especially those of married women. The number of women in industry, Mr. Henry Lesser said, is just over 5,500,000, or about one-half that of men. There has been a gradual increase in the number of women remaining in insurable employment after marriage, and 21 per cent. of insured women now are married. The women show an excess of 4 per cent. in their claims on sickness benefit, and 38 per cent. in those on disablement benefit over those made by men. Seeing that only 15 per cent. of those insured are over the age of 45, chronic invalidity must be very high among the younger insured women. The continuous unemployment was, he said, likely to cause societies to find themselves in a precarious position, which might be summarised as follows.

THE STORY OF THE DISCOVERY.

An investigation into the sickness and disablement experiences of a group of societies from 1921–27, conducted by the Government Actuary at the request of the Ministry of Health, showed that for this period the percentage increase in the total number of weeks covered by sickness and disablement claims had seriously increased for all classes. (Disablement benefit, it should be borne in mind, only becomes payable after 26 weeks of sickness benefit have been paid.) A study of this document led to investigations by the regional medical staff of the Ministry, which included: (1) a scrutiny of the results of the references to that staff in 1929; (2) a detailed analysis of about one-sixth of these references; (3) an investigation of conditions, especially as regards incapacity to work, of a large sample of insured persons who were in receipt of benefit on May 5th, 1930.

INTERPRETATION OF MEMO. 329/IC.

Their results were published (without consultation with the insurance medical service) in the famous Memo. 329/IC, about the middle of 1931. In an endeavour to find out whether the actuarial calculation was wrong, or whether it was due to payment of persons not entitled to benefit, possibly wrongly certified, the following tendencies were elicited: (1) A generally continuous rise of claims for both sickness and disablement benefits. (2) An increase in the number of claimants per cent. of societies but not of the average duration of claims. (3) The much larger number of women's claims compared with those of men. This suggested some possible economic cause, not dependent on general health.

After considering the causes which make women more ready to claim than men, especially in minor ailments; dealing with a criticism, that now, owing to economic depression, people claim who would not have done so years ago; and realising the encouragement now given to persons to look after health, the report states that in the main the increase is due to the number of persons who receive sickness or disablement benefit, although not incapable of work. A study of all the references to the regional medical staff during 1929 showed that 53 per cent. of those referred ceased to draw benefit, after being notified of the reference. (The percentage for 1931 is higher, namely, 61.) Of these (1) over 14 per cent. received final certificates on the day of the receipt of the reference, or on the day after; (2) 19 per cent., not having final certificates, did not attend, and ceased

to draw benefit; (3) and over 19 per cent. were found not incapable of work after examination.

"EFFECTIVE REFERENCES."

The above figures deal with what are known as effective references, which means that the notice that the insured person is to be referred for examination by the R.M.O. is received by both doctor and patient, before the final certificate has been given. Analysed into special classes of insured persons the following figures emerged—

—	Percentage increase in claims of 1927 over 1931.		Percentage ceasing benefit as result of May 5th reference.
	Sickness benefit.	Disablement benefit.	
Men	41	85	9·8
Unmarried women	60	98	14·2
Married women 46 and over ..	76	120	11·6
Married women 45 and under..	117	189	19·0

showing that married women 45 and under, and unmarried women, show the highest percentage of those ceasing benefit after reference, as well as the greatest increase in the sickness and disablement claims.

INDIVIDUAL PRACTICES.

Scrutiny was also made of the results by references of individual practitioners. Comparison was made by groups, each group being served by one examination centre, and it was thus possible to compare, not only (1) the total number of patients who ceased to draw benefit, but also (2) those who received a final certificate between the time of receiving the notice to attend and the time when the report was returned to the divisional medical officer, (3) those who, being summoned, failed to attend, and (4) those who, being examined at the centre, were found not incapable of work. The figures for a large number of practices were compared, existing partnerships being treated as one; of these 1141 practices had over 50 patients each referred in the period. The results showed that those who ceased to draw benefit varied in these practices from 20 per cent. to 80 per cent., the average being 53.

In 117 practices, not exceeding 41 %
„ 378 „ „ „ 48 % } Ceased to draw benefit.
„ 376 „ exceeding 55 %

The figure 48 per cent. is taken as the average above which lack of care in certification is suspected.

VIEWS OF THE I.A.C.

How far the conclusion based upon the statistics published in Memo. 329/IC were justified, was keenly debated by the Insurance Acts Committee, which in a reply controverting the indictment of the panel doctor's certification as the cause of increased claims suggested that the chief causes were to be found in:

(1) Propaganda by insurance committees and others showing the wisdom of exercising rights.

(2) Knowledge of rights (including the effect which the elimination of the first three days of incapacity has on future claims during the year).

(3) Diminution of prejudice against exercising these rights.

(4) Economic necessity for claiming rights.

(5) Increased advice and, in some cases, pressure from approved societies' agents, works' officers, and welfare workers and others, to claim benefits.

(6) Increase in the scale of sickness benefit in some societies increasing the inducement to claim benefits.

(7) A higher standard of what constitutes health on the part of the whole community. This applies especially to pregnancy and the puerperium.

(8) There was a definite increase in work as shown by prescriptions, for example:—

In 1921 there were 30,200,000 prescriptions.
„ 1927 „ „ 53,931,000 „

This would indicate the increase in sickness claim.

(9) Modern treatment prolongs life and therefore leads to more sickness claims.

Other arguments used against the Minister's conclusions, including the disinclination of insured persons to take a journey, often a long one, to be examined by a strange doctor when he feels he will, in a day or so, be fit to work. The Insurance Acts Committee concluded: (1) that it is not proved, and is highly improbable, that the increase in claims has been brought about by defective certification of persons who are not incapable of work; and (2) there is still a large body of insured persons who do not claim sickness benefit, although they could properly be certified as incapable of work.

THE PRESENT POSITION.

So much for the past. It appears however that claims of women—unmarried, and married and under 45—are still on the increase. Negotiations are being conducted with the idea of modifying the benefits of these persons, details of which have not yet been decided. One suggestion is that the financial payment to this class of insured persons should be reduced. Another that sickness and disablement benefit should cease on marriage, a much larger maternity benefit being substituted. The latter suggestion would eliminate the difficult question of sickness benefit payable during pregnancy.

On the certification question, cases are now being reported to panel committees, showing the results of the R.M.O.'s investigation of the certification figures of particular doctors in the following form:—

(1) The number of persons referred in the period who had not received a final certificate up to two days before the doctor's receipt of the notice of examination (R.M.2), say	116
(2) The number who receive, a final certificate within two days preceding the doctor's receipt of R.M.2, say	6
(3) The number in benefit up to the date of the doctor's receipt of R.M.2 being the difference. (Effective references)	110

A HYPOTHETICAL CASE.

The return might take some such form as the following—a hypothetical case.

Final certificates issued on one of two days between the doctor's receipt of R.M.2 and its return, say	14
The number who did not attend, say	36
The number who were examined and found out incapable, say	17
The total ceasing benefit being	67
Examined and found incapable, say	39
Unfit to attend, say	4
	110

This hypothetical case gives a percentage of 60, and would be regarded as highly suggestive of lax certification. Armed with these figures, the R.M.O. visits the panel doctor to obtain his explanation. The doctor can request a member of his panel committee to be present at the interview to assist him in setting out the points that may arise. If the explanation is not considered satisfactory, the case is reported by the Ministry to the panel committee, who through their panel service subcommittee, investigate and decide whether there has been a failure; if so, what is the extent and gravity of the failure; together with a recommendation as to the action, if any, which should be taken by the Minister, either by withholding money, or otherwise, as the panel committee may think fit.

The panel committee's report must be sent to the Ministry and to the practitioner, both of whom are entitled to appeal against the finding. The provision of the principal regulations relating to the determination of appeals apply in this case.

A MODEL HOSPITAL.—During Liverpool Hospital Week, organised by the Merseyside Hospital Council, which will begin on June 6th, there will be on view a model hospital "equipped with modern facilities and actually working." It has been designed by Mr. Gilbert Fraser. The week coincides with the annual conference in Liverpool of the British Hospitals Association and the Association of Hospital Officers.

PUBLIC HEALTH SERVICES

SCHOOL MEDICAL SERVICE.

City or town.	No. on roll.	Average attendance.	Routine inspection.	Special examinations and reinspections	Percentage of defects.
City of Coventry	23,647	21,504	6,794	9,142	22·7
Taunton ..	2,895	2,637	1,044	3,874	20·9
Torquay ..	4,114	3,556	1,321	7,213	22·1

City of Coventry.

THE 1931 report of the S.M.O. for Coventry (Dr. A. Massey) is the first to be received. It is noted that a boundary extension in April will add some 1300 to the number of school-children; this addition will make increased clinic accommodation still more necessary, and it is regrettable that the suggested new clinic has not been established. Dr. J. Murray describes the open-air school at Corley as enhancing the community value of the children who are lucky enough to go there. Among those who benefit he includes some slight cases of rheumatism, whereas most school medical officers do not find that rheumatic children do well in open-air schools. Dr. M. J. Moir, speaking of the Centaur Roof Road School, says that the new admissions appeared more than usual to need open-air care. The good influence of the school may be enhanced by the relative purity of the atmosphere of Coventry which was recorded in the report on smoke pollution. This city may also be proud of possessing an excellent special school for the mentally defective where the instruction to the elder girls covers all branches of housewifery including shopping, cooking, and serving of meals. These are learnt in the most practical way in the provision of school dinners.

In dental work 7156 children were examined, 5730 were found to have defects and 4538 of them received treatment—i.e., nearly 80 per cent. This is an achievement, but the senior dentist, Mr. M. Raeside, regrets that the teeth of the average school entrants, 5 to 6 years of age, show no improvement. Parents must be brought to realise that the temporary teeth are as important as the permanent teeth, and that signs of decay in the first dentition should receive early attention. There is no doubt, he says, that dietetic deficiencies are one of the chief causes of susceptibility to dental caries, and the liability to disease is greatly increased by overcrowding and malposition of the teeth, neglect of cleanliness, and close proximity to teeth already infected.

The ill-effects of overcrowding and malposition are arguments for the extension of orthodontic work which might not be held to justify its cost if its benefits were purely æsthetic.

The operations for tonsils and adenoids are performed at hospital without any anæsthetic. The results at Coventry seem remarkably good, and the surgeon, Mr. F. W. Sydenham, urges that the method makes for safety and diminishes shock.

In his introduction Dr. Massey says:—

"For children in its care, the School Medical Service essays firstly to maintain physical normality, and secondly to restore the defective to that level. Work in the first category does not admit so readily of statistical record as does that in the second, nor does it therefore extend to the doer the same lure of measurable achievement. Nevertheless those engaged on the medical side of school work do well to cultivate the physiological outlook."

In Coventry this outlook is seen in the attention given to the teaching of hygiene in the schools, the instruction in dental hygiene arranged with the help of the Dental Board, and to the increased activity in physical training.

Taunton.

Last year saw the opening of a new building, the health centre, intended as a centre for the preventive activities of both the education and the maternity and child welfare committees.

It is a detached building of one storey, built in the shape of the letter L, one limb containing a large waiting-room with a supply of drinking water and surrounded on three sides by (1) a room for the medical officer; (2) a room to be used by the school nurses for the treatment of minor ailments and at other times as a weighing room for infants or dressing room for the antenatal clinic; (3) the dental surgeon's room with separate recovery room and exit; (4) an artificial sunlight room, with side room for dressing to be used at other times by the ophthalmologist. Between the two limbs of the L is a common entrance passage, and in the other limb is a large room subdivisible by a screen, and with a smaller annexe fitted with sink and hot water. The large room is used either as the orthopædic clinic or for the social side of the infant welfare work.

This centre illustrates the close coödination between the school and the infant welfare work which is facilitated by the fact that the M.O.H., Dr. John Allen, carries out the duties under both committees, and the school nurses act as attendance officers. It is therefore not surprising that the attendance of parents at medical inspections is 79·2 per cent., and for the entrants, 89·1 per cent. Another good figure is that for dental treatment, which is 78 per cent.

The orthopædic clinic is held on Fridays, the surgeon, Miss M. Forrester-Brown, attending once a month. A posture class is held, girls coming at 9.30 A.M. and boys at 11 A.M., the object being to teach them to do certain simple exercises at home, by which their postural defects can be corrected. Lack of space and time makes it possible to send only those children with severe defects, and there are many others who need these exercises, who could do them on the school premises if specially trained teachers were available. Five children were admitted to the Combe Park Orthopædic Hospital for operative treatment. The clinic is greatly helped by the members of the Somerset V.A.D. 106, and other helpers. They provide assistance in clerical work, the preparation of patients and material, and the provision of transport.

The artificial sunlight treatment has been in use since May 28th and some good results are described. The medical officer for this special work, as for almost everything else in the borough, appears to be Dr. Allen himself, with the aid of a special part-time nurse. Dr. Allen is also the infant life protection visitor, and his health visitor is authorised as a visitor to foster-children under 5, and his school nurses to those from 5 to 9. It is to be noted that the upper limit of age is 9 in Taunton instead of 7 as elsewhere. The raising of the age is the result of a special Bill, and Taunton is the first authority in England to obtain the increase.

Torquay.

Dr. Thomas Dunlop says there has been no outstanding features in the work of medical inspection and treatment of school-children in Torquay during 1931, and Dr. J. V. A. Simpson mentions that in the interests of economy the form of report is considerably shortened. The report has in fact become almost a plain recital of figures with none of the illuminating comments and records of research which did so much credit to the organisation. Some of the detailed descriptions given in previous reports were of more than local or temporary interest, and it is to be hoped that they will be restored.

Mr. A. Macdonald's account of an inquiry into the period of decay of the first molar teeth might have been more instructive if his tables and figures had been amplified with letterpress. But it is clear that the first molar tooth is attacked much more

than any of the other permanent teeth and that it is especially liable to decay in the left lower jaw.

The school medical work in general, Dr. Dunlop says, has been carried on with uniform smoothness. Two statements are not enlarged upon nor explained: "On Jan. 31st Miss F. A. Salmon resigned the appointment of health visitor and school nurse, and the vacancy was not filled." "The two subclinics which had previously been inaugurated at Westhill School and at Barton School were discontinued at the end of January." There is a brief note on the success of a school camp held at Chagford to which staff and scholars of a Central school removed en bloc for a week.

In the report of the ophthalmic surgeon, Mr. J. Masterton Thomson, there are some interesting allusions to the advantages of coöperation. In one direction it is the observation of disturbance of general health noted during the routine examinations of the eyes; in another it is the full coöperation between the maternity and child welfare centres and the school medical departments by means of which 15 cases of eye defect and squint were seen in children under school age. Good results are noted in the fusion training in the care of squints, 23 of the cases having made in all 548 attendances during the year.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED MARCH 26TH, 1932.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 41 (last week 61); scarlet fever, 1375; diphtheria, 790; enteric fever, 15; pneumonia (primary or influenzal), 1573; puerperal fever, 53; puerperal pyrexia, 86; cerebro-spinal fever, 69; acute poliomyelitis, 3; acute polio-encephalitis, 1; encephalitis lethargica, 10; continued fever, 1; dysentery, 16; and ophthalmia neonatorum 86. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on March 29th–30th was as follows: Small-pox, 115 under treatment, 10 under observation (last week 105 and 3 respectively); scarlet fever, 1405; diphtheria, 1475; enteric fever, 10; measles, 2550; whooping-cough, 428; puerperal fever, 33 (plus 11 babies); encephalitis lethargica, 226; poliomyelitis, 4; "other diseases," 153. At St. Margaret's Hospital there were 10 babies with ophthalmia neonatorum.

Deaths.—In 117 great towns, including London, there were no deaths from small-pox, 1 (1) from enteric fever, 124 (45) from measles, 5 (3) from scarlet fever, 70 (12) from whooping-cough, 21 (3) from diphtheria, 55 (16) from diarrhœa and enteritis under 2 years, and 212 (40) from influenza. The figures in parentheses are those for London itself.

There was again a decline in the number of deaths from influenza, the largest totals being recorded from Bristol with 16, Leeds and Sheffield with 9 each, Swansea, Oxford, and Stoke-on-Trent with 8 each. Fourteen of the fatal cases of measles were recorded in Manchester, 12 in Liverpool, and 10 in West Ham. There were 8 deaths from whooping-cough in Birmingham, 7 in Liverpool, and 6 in Manchester. Five of the deaths from diphtheria were in Liverpool and 4 in Manchester.

The number of stillbirths notified during the week was 268 (corresponding to a rate of 44 per 1000 total births), including 39 in London.

BIRMINGHAM WOMEN'S HOSPTIAL.—The annual report of this institution and its maternity hospital shows that, although there are only 182 beds altogether, 4245 in-patients passed through them last year. The average stay in the women's hospital has been reduced to 14·8 from 15·2 days. There is also great pressure upon the paying beds, to which 512 cases were admitted. The average weekly cost per in-patient was £3 14*s.* 10*d.*, a reduction of 3*s.* 2*d.* The results of the use of radium "give cause for satisfaction and hope for the future." There is a deficiency of £5000 on the year's working, which is offset by a rather larger amount of free legacies.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE.

THE following appointments are notified: Surg. Capt. F. L. Smith to *Pembroke* for R.N. Hospital, Great Yarmouth. Surg. Lt.-Comdr. D. H. Kernohan to *Delhi* and to *Dragon*. Surg. Lts. H. A. Clarke to *Pembroke* for R.N. Barracks, Chatham; G. D. J. Ball and D. Ewart to *Hermes*; and J. B. W. Rowe to *Vindictive*.

ROYAL NAVAL VOLUNTEER RESERVE.

Proby. Surg. Lt. M. Godwin to be Surg. Lt.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. H. W. Russell, having attained the age for compulsory retirement, is placed on retd. pay.

Maj. J. R. Lloyd to be Lt.-Col.

Lt. J. Davidson, from Gen. List, T.A., is granted a temp. commn. in the rank of Lt.

T. L. O'C. Ryan to be Lt. (on prob.).

ARMY DENTAL CORPS.

Lt.-Col. W. T. Finlayson relinquishes his appt. under Art. 520 (*b*) Royal Warrant for Pay and Promotion, 1931.

ARMY RESERVE OF OFFICERS.

The undermentioned, having attained the age limit of liability to recall, cease to belong to the Res. of Off: Col. V. J. Crawford, D.S.O., late R.A.M.C.; and Lt.-Cols. C. Bramhall and W. J. P. Adye-Curran.

TERRITORIAL ARMY.

Capt. G. Young to be Maj.

Lt. W. E. Hayes to be Capt.

INDIAN MEDICAL SERVICE.

Lts. to be Capts.: D. Tennant, H. T. McWilliams, and W. P. Lappin.

Lt. (on prob.) A. M. Chaudhuri to be Capt. (on prob.).

Lt. J. H. Gorman to be Capt. (prov.).

Lt. (on prob.) R. R. Bakhshi to be Capt. (prov.) (on prob.).

Capt. (prov.) L. G. Backhurst is confirmed in his rank.

To be Capts. (on prob.): Gopal Das Malhoutra; Bantwal Panduranga Baliga; Raghubansa Kishore Tandon, from I.M.S. (T.C.); Amar Nath Chopra; Bhagat Ram Tandon; Manoranjan Sen Gupta, from I.M.S. (T.C.); Devendra Nath Chakravarti, from I.M.S. (T.C.); Tolaram Bhajsingh Pahlajani, from I.M.S. (T.C.); Assa Singh, from I.M.S (T.C.); Subbier Annaswami.

To be Lts. (on prob.): Rewati Raman Bakhshi, from I.M.S. (T.C.); Bhagwan Das Khurana, from I.M.S. (T.C.); Diwan Chand Chopra, from I.M.S. (T.C.); Jaswant Singh, from I.M.S. (T.C.); Anil Kumar Gupta; Debi Prasad Mitra, from I.M.S. (T.C.); Taquid Deen Ahmad, from I.M.S. (T.C.); Mohammad Jafar, from I.M.S. (T.C.); Abani Mohan Chaudhuri; Percy Vivian Bamford; Harold Duncan Ross Zscherpel; Fateh Mohammad Khan, from I.M.S. (T.C.); Dev Datt, from I.M.S. (T.C.); Madan Gopal Saincher, from I.M.S. (T.C.); Saiyed Wasiul Hasan Askari, from I.M.S. (T.C.); Venkatachari Srinivasan; Sangham Lal; Khurshed Jilani, from I.M.S. (T.C.); Jaswant Rai Dogra; Dewan Pitamber Nath, from I.M.S. (T.C.); Sarup Narain; Bashi Lal Taneja, from I.M.S. (T.C.); Hoe Min Sein from I.M.S. (T.C.); Humayun Hassan Mahmood, M.B.

ROYAL WEST SUSSEX HOSPITAL.—The necessity of restoring the nurses' rooms in the Dr. Ewart memorial home is the main feature of the annual report of the governors of this hospital. When the nurses' home was erected, 11 rooms were taken from the nurses for the use of private patients, since the governors were anxious to discover what support and what need there was for private patients before proceeding with further building. The need for a private patients' block was fully demonstrated; but at the end of two years the nurses were still deprived of a quarter of their rooms, and several had still to live in the hospital and could not, therefore, obtain complete relief from the hospital atmosphere. The governors have decided to close the private patients' rooms from June 30th next, and to appeal for funds to build a private paying patients' block at a cost of approximately £6000. The sum of £2600 is in hand from the centenary appeal fund, but last year despite strict economy—the average cost of patients per day was reduced from 7*s.* 4*d.* in 1930 to 7*s.* 2*d.*—the deficit on the income and expenditure account amounted to £998.

CORRESPONDENCE

HÆMOLYTIC AND PERNICIOUS ANÆMIAS.

To the Editor of THE LANCET.

SIR,—In his final Goulstonian lecture (THE LANCET, March 26th) Dr. Witts discussed the hæmolytic anæmia of pregnancy. It is important to differentiate between this condition and pernicious anæmia associated with pregnancy owing to the difference in prognosis and treatment. The outstanding features in hæmolytic anæmia of pregnancy are the presence of free hydrochloric acid and enzymes in the gastric juice; a strong tendency to show rapid improvement after parturition to a normal blood picture, especially with suitable treatment; a maintenance of the complete remission even after discontinuance of treatment; and a disinclination to relapse in subsequent pregnancies. On the other hand, pernicious anæmia associated with pregnancy shows achylia gastrica, a grave tendency to fatal termination after parturition (if inadequately treated), and the necessity for continued treatment, the subsequent prognosis being as in ordinary cases of pernicious anæmia. I hope to show in a further paper that true pernicious anæmia occurs in association with and is not due to the gravid state per se. Cases of hæmolytic anæmia of pregnancy have been observed to respond to suitable treatment without further relapse even in subsequent pregnancies, despite discontinuance of treatment, whilst known cases of pernicious anæmia have been kept under observation throughout pregnancies and parturition on carefully adjusted therapy. I have found that in most cases satisfactory treatment consists of intravenous liver therapy, or oral administration of active[1] desiccated hog's stomach preparations. The former is eminently suitable where auto-hæmagglutination exists.[2] Cases of hæmolytic anæmia are able to discontinue all treatment after the blood picture has returned to normal, but in those of pernicious anæmia associated with pregnancy the treatment must be continued indefinitely, as in an ordinary case of pernicious anæmia.

I am, Sir, yours faithfully,

JOHN F. WILKINSON.

Royal Infirmary, Manchester, April 2nd, 1932.

PS.—May I be allowed, referring to another matter wholly, to comment on your annotation of April 2nd upon the paper by Dr. Klein and myself. It would appear as though we were stating that a hæmopoietic enzyme was present in gastric tissue based upon its thermolability above 45° C. We suggest that the substance is of an *enzyme-like* character and may possibly be an enzyme. Our evidence is based upon other observations, additional to the thermolability, such as behaviour in the presence of solutions of differing pH, necessity for a substrate, precipitation with alcohol, &c. We were particularly careful to augment the ordinary hospital diet in the special cases employed by the addition of protein in the form of meat given with the preparation under examination. The name "hæmopoietin" was chosen as not necessarily implying an enzyme character—the usual suffix *-ase* may be added if and when hæmopoietin is definitely proved to be an enzyme.

[1] Brit. Med. Jour., Feb. 20th, p. 325.
[2] THE LANCET, 1931, ii., 791.

USE OF TUBERCULIN IN DIAGNOSIS.

To the Editor of THE LANCET.

SIR,—I have read with great interest Dr. D'Arcy Hart's report on the Value of Tuberculin Tests in Man.[1] His own investigations appear to be carried out with great care and accuracy, and his conclusions in general sound and logical. I was, however, a little surprised to find Pirquet's reaction described as practically useless, both in the preface (by the Medical Research Council) and by the author himself. Dr. Hart has not given Pirquet a chance. He has himself performed no Pirquet tests at all, as far as I can see. His condemnation is based partly upon the many bad results of former investigators using various "Pirquet tests," and partly on theoretical grounds.

As to the former investigators of the Pirquet test, many of them used tuberculin in various dilutions, the reactions were partly read after 24 hours, and their readings were not measured. When a man is found to be misusing a very simple test, it is not discreditable to the test, but to the man. On p. 13 of Dr. Hart's report we see that quite a number of scientists have had post-mortem controls of their Pirquet tests, which upon the whole confirmed the results of their tests. Where are the human post-mortem controls of the Mantoux test? On p. 87 we see that Heimbeck's nurses became Pirquet-positive, "nearly all of them," within one or two years. Dr. Heimbeck has published Pirquet curves reaching 100 per cent. positive reactors among the adults in Oslo, not only among the working classes, but in the middle classes also.[2] The author ought to be more careful before condemning a test as "not delicate" enough, when it can give 100 per cent. positive reactors in the apparently healthy population. Scheel and his school (especially Strøm, Ustvedt, Leikvam) have given the Pirquet test a more reliable basis than any other tuberculin test.

To 10 c.cm. standardised tuberculin is added a drop of liquid carbolic acid. The tuberculin then will keep its full power for months—at least in a cool, dark place. With a glass rod implanted through the cork, one places a drop of the solution on the ether-cleansed skin of the arm. A quite superficial cut is made through the drop with a lancet (5–10 mm. length; no bleeding). The arm is kept naked for 10 minutes, and the tuberculin is not washed off afterwards. After two or three days the reaction is read; when it is doubtful or negative, the test is repeated at once. (Two or three cuts are now to be preferred.) A reaction of at least 2 mm. erythema with palpable infiltration is positive. No control is necessary. Under ordinary circumstances further retesting has been of negligible value.

Our Pirquet test gives, without any repeating, as many positive reactions as 0·1 mg. Mantoux (1·0 mg.?). Nobody has clearly demonstrated as yet that the extra positives given by stronger Mantoux doses are real reactions. Tuberculous persons have, as Dr. Hart says, a marked tendency to non-specific intradermo-reactions, partly of the delayed type. In order to master them he has used glycerinated broth controls. But the control solution, which is not identical with tuberculin minus the specific part of tuberculin, is not a control solution. His "extra-positives" may be pseudopositives. He has chosen a reaction of 5 mm. as a borderline reaction. I cannot see that this chosen borderline has any convincing scientific basis.

The repeated Pirquet test is, in my opinion, the better test to-day. Its chief fault is its simplicity;

[1] Med. Research Council Spec. Rep. Series No. 164. See THE LANCET, March 5th, p. 521.
[2] Arch. Int. Med., 1931, xlvii., 901.

most people do not think they need to learn how to perform and read it. Very careful investigations are needed before the Mantoux test with strong concentrations is placed on a reliable basis.

My excuse for my great keenness on this point is the fact that most of our recent Norwegian studies in the pathology and epidemiology of tuberculosis are based on the Pirquet test, and we would not like our Pirquet work to be included in the works totally condemned by the Medical Research Council.

I am, Sir, yours faithfully,

ROLO HOLJER DAHL.

Ulleval IX, Oslo, March 31st, 1932.

PULMONARY TUBERCULOSIS IN CHILDHOOD.

To the Editor of THE LANCET.

SIR,—Dr. Bentley, in your issue of March 26th, states "that while the appearance of positive sputum disease in any child under 16 years of age is rare, the condition below the age of 10 is a medical curiosity." If he means by "positive sputum disease" a condition in which the child coughs out sputum containing tubercle bacilli his statement is no doubt correct, as children under 10 rarely do this; they swallow it. But if he means, as I believe he does, that tubercle bacilli are very rarely present in the sputum of young children I most definitely disagree with him. As has been said, children swallow their sputum, and consequently it can only be obtained by the stomach washout method described by Meunier and others. If this is done, however, a surprising number of positive cases will be found among young children and even infants. Recently, for instance, in five consecutive cases of the tuberculous type of erythema nodosum I found tubercle bacilli in three, aged 3, 5, and 7 years respectively, while Wallgren and many other continental writers have had the same experience with larger series of cases. Indeed this method is a great help in the diagnosis of tuberculosis in the child and should be used as a routine in all doubtful pulmonary conditions in childhood.

I am, Sir, yours faithfully,

W. ROBERT F. COLLIS.

The Hospital for Sick Children, Great Ormond-street, W.C., April 2nd, 1932.

TOXIC EFFECTS OF PHENOLPHTHALEIN.

To the Editor of THE LANCET.

SIR,—It may be of some interest to your readers to know that in certain cases phenolphthalein, which is now being widely used as an aperient, may give rise to a marked toxic reaction. In my own personal case a normal dose of it produces a violent urticarial eruption covering nearly the whole of the flexor aspects of the forearms, a collar-like circle round the neck, and in lesser degrees the calves and hands are affected. The reaction commences within half an hour of ingestion with intense tingling and itching, and the appearance of large circular areas of erythema which indurate into plaques and finally become blebs which exude serum, and the scars left are purple in colour.

There has lately been put on the market a pill, in which the name Aperione appears in the formula; this would appear to be responsible for the worst attack I have yet had. The manufacturers describe it as "non-toxic, somewhat similar to phenolphthalein." The Extra Pharmacopœia says: "Skin rashes reported in America from phenolphthalein" and "cases of toxic poisoning from submaximal doses," "such ill-effects have not been noted here." There appear to be at least seven names for the drug, the best known of these are Purgen and Laxoin. Aperione is yet another for what is apparently a very similar product.

My objects in writing are firstly that it seems to me that it should be possible for anyone to avoid a drug without having to consult a dictionary of trade names, if such a thing exists. Secondly, that it is possible that mine is not such a very rare case and that others may be wrongly attributed to food poisoning, as personally I had three attacks each due to a different preparation before being able to trace the cause. The same effect is produced in my case by Veramon but in a much milder degree, and I have known the latter to produce hæmoglobinuria in a patient who took a considerable quantity of it.

I am, Sir, yours faithfully,

F. A. PHILLIPPS.

Lower Sloane-street, S.W., March 27th, 1932.

THE PROBLEMS OF MARRIAGE.

To the Editor of THE LANCET.

SIR,—A recent letter in your columns, signed by the honorary medical secretaries of the British Social Hygiene Council, draws attention to the establishment of a Personal Problems Bureau, the consultant being Mrs. Neville Rolfe, the Secretary General of that Council.

In answer to a letter of inquiry from me as to whether the advice to be given "to those about to marry" would include at Mrs. Rolfe's discretion advice as to artificial measures of birth control, I am informed by Mrs. Rolfe that—

> "I am hoping to give assistance on the lines of the handbook on Preparation for Marriage to girls intending marriage. . . . . It does not appear to me that the question of birth control is likely to enter to any considerable extent. In the event of an individual requesting advice on methods they would be referred to the medical profession."

My desire in this letter is carefully to avoid the very disputable point as to whether such advice should ever be given "in preparation for marriage," and the still more debatable point as to whether that advice should be given under the arrangements now proposed.

But there arises for supporters of the British Social Hygiene Council a more general and extremely important problem. I was actively concerned in recommending that this Society (then called the National Council for Combating Venereal Diseases) should be formed as a semi-quasi-official body to undertake educational work conducing to the prevention of these diseases and the protection of the sanctity of family life, by the promotion of chastity and continence. This body has hitherto refrained from action which would imply approval of artificial birth control. The establishment, however, of a consultation centre at which advice in preparation for marriage may include advice on birth control—even if "not to any considerable extent"—we are told by the honorary medical secretaries has received "the full support and approval of the Social Hygiene Council." Furthermore, it is intended that part of the profits coming from these consultations shall be added to the funds of the British Social Hygiene Council.

This obviously is a new departure in policy of great significance, and cannot leave the position of the Council unchanged. Clearly it is now for every subscriber to its funds, including each contributing borough council and county council, to decide whether they are in sympathy with this departure of the

British Social Hygiene Council from the position of neutrality hitherto ostensibly maintained on this most controversial subject of birth control.

I am, Sir, yours faithfully,

ARTHUR NEWSHOLME.

The Athenæum, London, W., March 28th, 1932.

To the Editor of THE LANCET.

SIR,—In a letter appearing in the *Medical Officer* of April 2nd, Sir Arthur Newsholme comments adversely on "the establishment of a Personal Problems Bureau, the consultant being Mrs. Neville Rolfe, Secretary General of the British Social Hygiene Council." The decision of the Council authorising the establishment of the Bureau was taken after full and careful consideration and after consultation with representatives of the members of the British Medical Association. The plan for such a Bureau arose out of a series of lectures on Preparation for Marriage organised in coöperation with the Churches.

Sir Arthur Newsholme draws the conclusion that advice on artificial birth control is to be given by Mrs. Neville Rolfe. This is incorrect. In a letter addressed to him, from which he quotes, Mrs. Neville Rolfe expressly informed him that "in the event of an individual requesting advice on methods they would be referred to the medical profession."

The main objects of the Bureau are to assist parents wishing assistance in handling difficulties in sex training of children and to advise girls intending marriage.

Sir Arthur Newsholme further states that as the Bureau has been established with the sanction of the British Social Hygiene Council this indicates a change of policy on their part in regard to the subject of birth control. This again is incorrect. The policy of the Council has not been changed; advice on artificial birth control will not become part of its work in the future any more than it has been in the past, unless and until some future decision of the Council should reverse the present policy.

I regret that Sir Arthur in support of his personal views should have allowed himself to suggest that in these circumstances subscribers to the funds of the British Social Hygiene Council are called upon to reconsider their attitude to the Council.

I am, Sir, yours faithfully,

KENNETH M. WALKER,
Hon. Medical Secretary, British Social Hygiene Council.

April 5th, 1932.

*** The letter above from Sir Arthur Newsholme is identical with that published last week in the *Medical Officer*, to which Mr. Kenneth Walker refers.—ED. L.

THE DURATION OF THE RED LOCHIA.

To the Editor of THE LANCET.

SIR,—I have seen a considerable number of cases treated by Dr. Hobbs's glycerin irrigation with remarkable success. I think he is right in pointing out that there are degrees of sepsis and that it is not necessary to have a rise of temperature in all cases; and also that when red lochia persist after the seventh day following a confinement or miscarriage, this symptom should be looked upon with suspicion, and glycerin irrigation should be immediately carried out so that no septic focus is left in the uterus. There can be no doubt that these chronic discharges lead to a great deal of ill-health in women, and it is high time that the profession regarded these cases in a more serious light. It is chiefly as a preventive measure that I regard Dr. Hobbs's treatment as so valuable. I agree with him that the long list of gynæcological cases can be considerably reduced by promoting free drainage from the uterus at the earliest possible moment, instead of waiting for abnormal signs to make their appearance in the pelvis.

Again, we have all come across cases of fibrositis and arthritis dating from the last confinement or miscarriage; and during the last few years in the vast majority of the cases I have seen there has been a history of a prolonged discharge which has remained untreated, and the symptoms of arthritis showed no signs of diminishing until the discharge had been cured. The amount of illness amongst married women under the National Insurance Act is causing grave concern to the friendly societies, and I believe a large amount of this sickness could be prevented if Dr. Hobbs's treatment were more widely known; so that the practitioner who at present adopts the expectant attitude can be provided with a simple and satisfactory method of treatment in these cases.

I am, Sir, yours faithfully,

Kensington, April 5th, 1932. RONALD CARTER.

CALCIUM CONTENT OF THE LIVER.

To the Editor of THE LANCET.

SIR,—Miss Wright and I are interested in the calcium content of the liver. Might I be allowed to request any of your readers, who may be in the position to do so, to send us portions of liver from women dying from eclampsia or hyperemesis gravidarum? We should like roughly ½ lb. of liver, from each lobe if possible, and the material without any preparation may be wrapped in waterproof material and posted to either of us at the Pharmacology Department, University College, Gower-street, W.C.1. It is because the method is prolonged, the apparatus specially made, and eclamptic livers are difficult to obtain, that I have ventured to make this request.—I am, Sir, yours faithfully,

April 5th, 1932. G. W. THEOBALD.

ANCOATS HOSPITAL, MANCHESTER.—At the annual meeting of this hospital on April 1st, it was stated that the year's working showed a deficit of £1350, which, however, was largely covered by legacies. The medical board's report stated that the staff believed that waste of time in the out-patient department could only be avoided by rigidly regarding this department as a purely consultative centre.

ROYAL VICTORIA HOSPITAL, BELFAST.—The annual meeting of this hospital was held on March 23rd with Lady Pirrie in the chair. During the year 1931, 6601 cases were treated in the wards, and this was the highest number yet recorded. At the extern department 47,603 new cases were examined. The total cost of maintenance and administration was £57,347, and the total receipts were £56,571. The daily average number of beds occupied was 410. During the year 168 road traffic and motor accident cases were admitted; their total cost of maintenance was £2175, and of this amount the hospital was paid only £658. A piece of ground has been rented to the Queen's University for the purpose of erecting a pathological institute which will eventually be connected with the hospital by a covered way, and under arrangement with the Queen's University the bacteriological and biochemical departments of the hospital will be transferred there. Great progress has been made in the erection of the new maternity hospital; but £50,000 is still required to complete the building and to purchase equipment. The board of management and medical staff are anxious to provide accommodation for patients of moderate means by the erection of a paying patients' block. The Children's Hospital, situated in the same area, is almost finished. In grouping and equipment this colony of allied institutions will, it is hoped, be almost unrivalled in the British Isles.

OBITUARY

GEORGE MATTHEW ROBERTSON, M.D., C.M. Edin., F.R.C.P. Edin.

WE announced the death last week of Prof. G. M. Robertson, which occurred on March 26th at his residence, Tipperlinn House, Morningside. He had been in failing health for some time and had intimated his intention of retiring from his appointments in the course of this year.

George Matthew Robertson was born in 1864, the son of Col. Robertson of Liddington Hall, Guildford. He received his preliminary education at Madras College, St. Andrew's, and completed his medical training at the University of Edinburgh, where he graduated M.B., C.M. in 1885. He served for a period as resident physician at the Royal Infirmary, Edinburgh, and having by that time decided to practise as an alienist took a post under Sir Thomas Clouston, then superintendent of Morningside, where he became senior resident assistant. He obtained the diploma of M.R.C.P. Edin. in 1891, and in 1892, being then the senior resident at Morningside, he was appointed physician-superintendent of Murthly Asylum. Here he introduced a villa system of housing the mentally afflicted, and made a considerable name for himself both on the scientific and administrative side of his specialty.

PROF. ROBERTSON.
[Photograph by Forbury & Son.

In 1893 he was elected to the fellowship of his College and in 1899 he was appointed physician to the Larbert Asylum, but shortly afterwards he succeeded his former chief, Clouston, as physician-superintendent of the Royal Edinburgh Hospital for Mental and Nervous Disorders, as Morningside is now termed. This was in 1903, so that for practically 30 years Prof. Robertson was in charge of the institution whose development owes so much to his energies. At the date of his appointment Morningside consisted of the two institutions West House and Craig House, and its reputation under Clouston was a very high one; but the scope of its activities was insufficient to meet the ideals of Robertson, who was a pioneer in the advocacy of the treatment of the insane as sick people—victims of disease in the same way as they might have been the victims of any other disease, and requiring in the same way treatment directed to alleviation and cure. To treat the mentally afflicted as sick people was his unswerving intention, and he was fortunate in finding in the Managers of the Royal Mental Hospital men who supported him in his views, and indeed suggested certain of the channels through which they might be carried out. For some time he had under consideration a scheme, with which his name is always associated, for the opening of nursing homes where patients suffering from incipient mental disorders could be watched, and preventive measures be employed when they still were likely to be efficient. In 1917 the Managers, accordingly, in support of Robertson's scheme, purchased houses in Edinburgh and opened them as private nursing homes, staffed with matrons and hospital trained nurses, to which the mentally sick were admitted on a system similar to that employed in dealing with patients suffering from other illnesses. The success of the institutions, whose inmates were mainly drawn from the upper classes, was such that ten years later the Managers of the Royal Mental Hospital built and opened the Jordanburn Nerve Hospital, where patients of all social grades could be received for examination and could remain for treatment, at nominal rates, on the recommendation of the examining physicians. A lecture theatre for students was attached to this hospital which became the centre for instruction in psychiatry at the University of Edinburgh, and Robertson was appointed lecturer in mental disease to the University. In 1920 the University raised the lectureship to the status of a professorial chair, when Robertson was immediately appointed to the post.

Probably none of his activities gave him greater pleasure than the teaching of students, and by the advances he made in psychiatric education at Edinburgh University he has erected to himself an enduring monument. He prepared his lectures with care, and he took great pains to make his subject interesting and palatable. As a lecturer he was able, with no loss of dignity, to adopt an easy and intimate manner with his class. The quality of his mind made abstract thought difficult for him, and in his lectures he did not indulge in abstruse theorising, which he believed only served to confuse his listeners. His teaching was thoroughly practical, and his aim was to equip the students with the knowledge which would enable them to deal in an enlightened manner with the cases of mental illness they would afterwards meet in practice. In his teaching he made full use of his wide clinical experience, and his phenomenal memory enabled him to enliven his lectures with graphic clinical pictures of cases which had passed through his hands. He recognised that the only way to teach psychiatry was to bring the student into intimate contact with actual cases of mental illness, and so he not only gave excellent clinical demonstrations, but he made his students attend in the wards of the Royal Edinburgh Hospital, and at the Psychiatry Out-patient Clinic of the Royal Infirmary, and take an active share in the treatments.

A special feature in Robertson's far-ranging services to psychiatry was his deep interest in the psychology of childhood, and at his instance a house was furnished in Morningside Park for the reception and study of these little patients under the supervision of Prof. James Drever, reader in psychology in the University of Edinburgh, and a recognised authority on the psychology of childhood.

Robertson's position was acknowledged by the prominent place that he occupied in the official medical world. At the Royal College of Physicians of Edinburgh he was at different times Cullen Prizeman and Morison lecturer and in 1926–27 President. At the Royal Medico-Psychological Association, where he was a medallist and twice prizeman, he was Maudsley lecturer, and in 1922 he occupied the president's chair. He was a corresponding member

of several continental societies and the University of St. Andrews conferred the degree of LL.D. upon him. He was an infrequent writer, but an untiring exponent of his science at social and scientific gatherings, where he enjoyed the greatest popularity due to his personality.

Dr. Bedford Pierce writes: "In paying a tribute to the value of Prof. Robertson's services to psychological medicine, I would specially refer to his work in connexion with the Royal Medico-Psychological Association. He was an active member supporting all efforts to improve conditions of treatment, the better training of medical students and of nurses. Those who attended the annual meeting of the Association when he was president will not readily forget the excellent arrangements, the high standard of the discussions, and the president's hospitality. He had the good fortune to possess a genial disposition and he was a delightful host. He was an excellent and fluent speaker, and was a far-seeing man and in matters of policy his judgment was of marked value. In controversy he was always courteous, and took pains to induce others to accept his opinions. He seemed rarely to forget he was a Scotsman, and delighted in his speeches at the Association meeting to explain how Scotland was far in advance of England in the management of mental hospitals and indeed in any direction that might be under consideration. But local patriotism did not exclude wider interests. He edited Dr. Barclay's translation of Kraepelin's monumental work, and recognised Bayle as the discoverer of general paralysis of the insane. Robertson filled with marked ability his important positions. Many have marvelled how it was possible for one man to direct successfully the medical administration of practically three mental hospitals—Craig House, West House, and later Jordanburn—whilst holding the chair of psychiatry and at the same time responding to the demands of a considerable private practice. It is to be feared that at last this was too great a task for even his exceptional powers and so we mourn his loss."

The following appreciation of Prof. Robertson reaches us from a colleague and friend: "Prof. G. M. Robertson's death will cause widespread sorrow to his many friends in this country and abroad, but none will lament his death so much as those who have had the privilege of working with him or serving under him. In many ways he was an exacting chief. He expected a great deal from his assistants, and while he resented inefficiency, no one was readier than he was to appreciate and reward merit and industry. He treated his assistants as colleagues rather than subordinates. He did not demand a slavish obedience from them; he rather encouraged initiative and self-reliance, even from his junior assistants. Like most men of really wide knowledge and experience, he was tolerant of the views and opinions of those less experienced than himself. Nothing gave him greater pleasure than to discuss a problem with his staff, and he was receptive of suggestions no matter from what source they came. He took a deep personal interest in every member of his staff, and he inspired in them loyalty and affection. He rarely failed to animate those around him with his own enthusiasm. His interest did not cease when they were no longer serving under him, for he followed their careers with keen interest, and kept in close touch with them. His qualities would have distinguished him in any walk of life. He was a man of action; with a fearless and buoyant mind. He was imbued with the true spirit of adventure. For him the successful completion of an undertaking was but a prelude to another venture. His life was a crusade against reactionary tendencies and archaic methods of treating mental disease, and the value of the reforms he effected is now universally acknowledged. His life was devoted to the improvement of the methods for treating the mentally afflicted. He had great social gifts. He was a delightful host, and a vivacious conversationalist. His cheerfulness and good humour never deserted him, and he inspired confidence and affection in all who came in contact with him. It is difficult to realise that he is gone, and it is certain that his vital personality will continue to exert an enduring influence on all who were intimately associated with him.

"And now that thou art lying, my dear old Carian guest,
A handful of grey ashes, long, long ago at rest,
Still are thy pleasant voices, thy nightingales, awake,
For Death, he taketh all away, but them he cannot take."

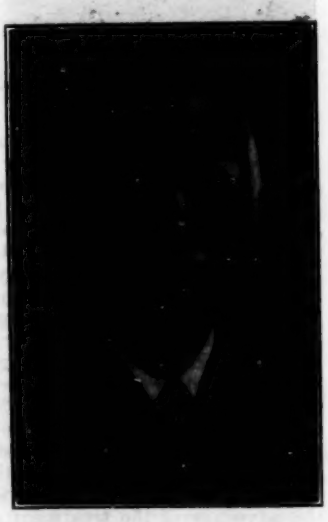
Prof. Robertson married Lilias, daughter of the late Daniel Ritchie, who died in 1914, and is survived by one son.

RUSHTON PARKER, M.B., B.S. Lond., F.R.C.S. Eng.,

PROFESSOR OF SURGERY IN THE UNIVERSITY OF LIVERPOOL.

THE death of Mr. Rushton Parker, the veteran professor of medicine in the University of Liverpool, was announced last week in the 86th year of his age. He had held the chair of surgery since the development of University College, Liverpool, into the University of Liverpool.

Rushton Parker was born in Liverpool in 1847 the eldest son of a medical practitioner in the city, and there received his preliminary education, proceeding to University College, London, to complete his medical studies. He was a distinguished student and the recipient of scholarships and medals, was house surgeon to University College Hospital in 1869, and demonstrator of anatomy in the medical school during the two following years. He then returned to Liverpool on receiving the appointment of surgeon to the Stanley Hospital, an institution which he served for six years, until in 1878 he was appointed assistant surgeon to the Royal Infirmary. Here he was already well known, for he had been a demonstrator in the medical school attached to the infirmary during the period that he was on the staff of the Stanley Hospital. At the school he now became lecturer on surgery and teacher of practical and operative surgery, and in 1882, while still assistant surgeon at the infirmary, he became professor of surgery at University College, Liverpool. This college, founded in 1881 and



PROF. RUSHTON PARKER.

[Photograph by J. Bacon & Sons.

incorporated into Victoria University in 1884, became by Royal Charter the University of Liverpool in 1903, since which date Rushton Parker held the chair of surgery.

Throughout his long career Rushton Parker was especially interested in mechanical surgery, while more than 50 years ago he did pioneer work in the surgery of tuberculosis and in the perfecting of the radical treatment of hernia. He published throughout a long range of time, notes on work which had come under his own hands, notably a paper on the extirpation of enlarged lymph glands which appeared in the *British Medical Journal* and another which was contributed to the proceedings of the Royal Medical and Chirurgical Society on ununited fractures healed by bone particles. In "Heath's Dictionary of Surgery" he wrote the articles on Peritonitis and on Diseases of the Nose, and in the *Clinical Journal* he published a practical paper on simple and compound fracture of the nose. He was also the author of a communication to the International Medical Congress of 1881 on the use of Thomas's splints.

To many generations of Liverpool students and doctors Rushton Parker has been a familiar figure, and those who never knew him in his active professional days will long recall his flowing Inverness cloak and sturdy short-stepped gait. "Now that he is no more among us," writes a member of the present University staff, "we hear stories of a kindly nature quite unsuspected by those who were brought into contact with him only as casual acquaintances. It was a kindliness extended not only to his friends, but to any who crossed his path who in the way of duty or by stress of fortune found themselves in difficulty, loneliness, or trouble." In his early days Rushton Parker was marked by openness of mind and a readiness to see and admit the value in what was new. Lister's principles were recognised at once by him as right, and were introduced into the practice at the Infirmary immediately. He was one of the first to recognise the genius of Hugh Owen Thomas and William McEwen, and that at a time when the former was not a persona grata with the profession at large. It was owing to his interest and encouragement that Thomas was persuaded to publish an account of his splints, and when the time came for the professor to accept his portrait from his admirers there was found faintly outlined, at his own request, upon the portrait a Thomas's splint.

Apart from his professional attainments he was a man of wide culture. He loved good books and good music and he was also a linguist of considerable parts. He was a member of the Geological Association and the Liverpool Geological Society,

Rushton Parker married in 1884 Catherine Elizabeth, the daughter of the late Mr. Thomas Bickerton, who predeceased him in 1924.

Dr. MARY CONSTANCE TUGMAN, who with her mother was knocked down and killed by a motor lorry in Newbury, Berks, on March 6th, was 33 years of age. Five years ago, having qualified from the London School of Medicine and St. Mary's Hospital, she decided on hearing from her uncle, the Archdeacon of Johannesburg, of the terrible need of the native mothers on the Rand, among whom the infant mortality-rate is 750 per 1000, to go out as a medical missionary. Her mother, who had done rescue work in England and South Africa, and had trained as a midwife, went with her, and together they opened a clinic in a back room of a native priest's house in Sophiatown, where they weighed babies, instructed native mothers in the care of their children, and treated the sick. Dr. Tugman also visited patients in their primitive homes, travelling about, often alone, in a motor-car with her equipment. In this way she treated 6000 cases in one year. Two other women doctors joined her later, and together they opened and took charge of ten clinics. Work on a nursing home was begun in 1930, but Dr. Tugman did not see this completed.

Dr. ALEXANDER DOUGALL BLACKADER, whose recent death is announced, was a graduate of McGill University, Montreal, and won a distinguished position in the University and the city. He was professor of therapeutics and pædiatrics, and as a specialist in children's diseases had a wide reputation. He became editor of the *Canadian Medical Association Journal* after the war, when Sir Andrew Macphail retired from this post, and held the editorship until recently with marked success. On his resignation last year, the Association established a Blackader lectureship in Pædiatrics in the University.

In his 59th year Dr. CHARLES HERBERT MOORHOUSE has died at Leeds where for many years he had been prominent both as practitioner and citizen. He received his medical education in the town, and on graduating as M.B. Vict. in 1897 took up resident appointments at the General Infirmary before entering on practice. His direct association with public affairs began in 1910 when he unsuccessfully sought election to the City Council. Not long afterwards he succeeded, and in the years that followed he twice became an alderman. For nearly 11 years he acted as chairman of the health committee, and he was made a justice of the peace in 1924. He leaves a widow and one daughter.

Dr. FRANCIS HENRY BODMAN, who has died at Bristol at the age of 87, was senior member of a large medical family. A graduate of Aberdeen, where he took the degrees of M.B. in 1870 and M.D. in 1872, he also studied at St. Bartholomew's Hospital. Entering practice in Devizes he became physician to the North Wilts Dispensary, but in the 'eighties moved to Clifton, where he became connected with the Bristol Homœopathic Dispensary and later the Homœopathic Hospital. Here he was a member of the staff for many years, as are two of his sons, Dr. J. H. Bodman and Mr. C. O. Bodman, at the present time. A third son, Dr. Alan Bodman, lives in Lisbon, while two grandsons are carrying on the medical tradition of the family in Bristol.

DOUBLE INFECTION.—In his annual report Dr. C. Barclay Reekie, medical superintendent of the West Fife infectious diseases joint hospital, states that there was only one death in the scarlet fever wards, and that there have been only two out of the 1885 cases admitted during the last four years. There had, however, been an increase in the mortality-rate from diphtheria, mainly as the result of the lack of early treatment. The medical staff are anxiously awaiting the completion of the observation block with 24 cubicles and accommodation for 48 patients. The eight existing observation wards have only attacked the fringe of the difficult problem of double infection. The hospital was designed for the preferential treatment of scarlet fever, diphtheria, and enteric fever, but the remarkable change in the incidence and rate of mortality of infectious diseases and the extension of the list of notifiable diseases have made the provision of cubicle accommodation necessary.

MEDICAL NEWS

University of Aberdeen.

On March 30th the following degrees and diploma were conferred:—

LL.D. (Hon.).—Sir Buckston Browne, F.R.C.S.
D.Sc.—R. A. Cleghorn, M.D.
M.D.—Robert Dawson and H. C. R. Gunter.
M.B., Ch.B.—Sheila Thomson (with second-class honours), Alexander Anderson, D. G. Anderson, J. L. Carle, J. J. Elphinstone, Agnes K. Forbes, Andrew A. Forbes, George Geddes, William Goldie, A. A. Harper, J. W. A. McIver, J. R. M. Mackie, H. W. T. Martin, David Middleton, W. N. Murray, J. C. Niven, J. W. Pickles, W. S. Pollock, E. D. Robb, John Warrack, and D. B. Watson.
D.P.H.—M. W. Keith.

University of Edinburgh.

At a graduation ceremonial on June 30th it is proposed to confer the honorary degree of LL.D. on Mr. D. M. Greig, conservator of the museum of the Royal College of Surgeons of Edinburgh, and on Emeritus Professor Arthur Robinson, who has lately retired from the chair of anatomy in the University.

University of Glasgow.

Among recipients of the honorary degree of LL.D. on June 15th will be Dr. Alessandri Roberto, professor of surgery in the University of Rome, Dr. A. Brown Kelly, consultant for diseases of nose, throat, and ear at the Glasgow Royal Asylum, and Sir James Alfred Ewing, late principal of the University of Edinburgh.

University of Birmingham.

Five Withering lectures on Some Aspects of Human Biology will be given by Mr. C. J. Bond, F.R.C.S., in the Medical Faculty Buildings at 4 P.M. on Wednesdays, April 20th and 27th, and May 4th, 11th, and 25th.

Post-graduate Course in Cardiology.

At the Liverpool and District Hospital for Diseases of the Heart a fortnight's course in cardiology will be held from April 27th to May 10th. The sessions will be from 3.30 to 5.30 P.M. Early application should be made to Miss Lewis, the secretary, at the hospital.

British Institute of Philosophy.

A course of six weekly lectures on the Foundations of Moral Values will be given by Prof. J. H. Muirhead on Wednesdays at 5.45 P.M., beginning April 27th, at University Hall, 14, Gordon-square, London, W.C.1. A syllabus can be obtained on application to the director of studies at University Hall.

International Congress of Psychology.

The tenth International Congress of Psychology will be held at Copenhagen from August 22nd to 27th. We are informed that after the congress there will be opportunities of visiting certain German and Austrian institutes of psychology. Elaborate programmes are being arranged for periods up to Sept. 14th, and particulars may be had from Prof. Dr. D. Katz, Moltkestrasse 13, Rostock (Meckl.), Germany.

National Institute of Industrial Psychology.

Dr. C. S. Myers, F.R.S., principal of the Institute, will give three lectures on Psychological and Social Factors in Business Rationalisation at 5.30 P.M. on Wednesdays, May 4th, 11th, and 18th, at the London School of Economics and Political Science.

National Institute of Child Psychology.

This institute (formerly the Children's Clinic) has been obliged to cut down some of its activities owing to shortage of funds. It is, however, carrying on at 20, Warwick-crescent, London, W., with a smaller staff and a reduced number of cases, selected for their special clinical interest.

Auxiliary R.A.M.C. Funds.

The annual meeting of the members of the Auxiliary R.A.M.C. Funds will be held at 5 P.M. on Friday, April 22nd, at 11, Chandos-street, Cavendish-square, W.1, when the officers and committee for the current year will be elected.

Central Association for Mental Welfare.

A course for those engaged in the training of mental defectives will be held in London from July 2nd to 23rd, under the auspices of this association (24, Buckingham Palace-road, S.W.1). It will consist of three weeks' training in methods of teaching defectives in occupation centres and institutions, including special methods for low-grade types. Students are recommended to supplement the course, if possible, by spending a week in a certified institution for defectives; the association will make arrangements for this additional week if desired.

London Hospital Medical College.

The Liddle triennial prize, of the value of £120, is offered for an essay on the Causes and Differentiation of Anæmias. Particulars will be found in our advertisement columns.

King's College Department of Anatomy.

The Hambleden Department of Anatomy will be opened at King's College at 3.30 P.M. on Wednesday, April 27th, by the Earl of Athlone, Chancellor of the University of London.

Royal Sanitary Institute.

A meeting will be held at this institute, 90, Buckingham Palace-road, London, S.W., at 6 P.M. on Tuesday, April 12th, when a discussion on the Bacteriology of Milk and Methods of Sampling will be opened by Dr. T. S. Keith and Mr. H. W. Walters.

National Safety Congress.

This congress, arranged by the National "Safety First" Association (119, Victoria-street, S.W.), will be held in London from May 4th to 7th. There will be a session on Safety in the Home at 10 A.M. on Thursday, the 5th, in the Caxton Hall, Westminster.

Leeds Maternity Hospital.

Last year there were 1715 births in the Leeds Maternity Hospital and 631 in the branches, an increase of 116. Of the total births in Leeds 32 per cent. took place in the Maternity Hospital.

Anaphylaxis from Bee-stings.

In connexion with the correspondence on this subject in our issues of March 12th and 19th, we are informed that at the annual meeting of the Apis Club (the English branch of the International Organisation for the Study of Bee-keeping) Dr. Keith Thompson will give an address on Bee Venom. The meeting will be held at St. Bride's Institute, Fleet-street, London, W.C., at 3 P.M. on Wednesday, April 20th, and members of the medical profession are invited to attend.

The Portrait of Dr. Alfred Cox.

Sir Arthur Cope's portrait of Dr. Alfred Cox has been transferred to Burlington House, and we are asked to advise those of our readers who see the picture at the exhibition, and who desire copies, to communicate with Mr. Bishop Harman at the B.M.A. House, Tavistock-square. The charges for these copies, carriage paid, are: engraved artist's proof (signed), £4 4s.; a print, £2 2s.; photogravure (17 in. by 14 in.), 14s.; oil facsimile (12 in. by 9½ in.), 6s.

"Journées Médicales," Evian.

The Medical Society of Evian-les-Bains announces the holding, for the second time, of "Journées Médicales" in the spa during the month of September, 1933. Prof. Lemierre will preside over the sessions, which will be devoted to the study of Renal Insufficiency. In this connexion the Société Anonyme des Eaux Minérales d'Evian-les-Bains offers a prize of 10,000 francs for the best original work on the Semeiological Value of Tests of Provoked Diuresis. The prize is named the Prix Chiais, in memory of the well-known hydrologist. The competing manuscripts must be anonymous, and reach the head office of the Société des Eaux Minérales d'Evian, 21, Rue de Londres, Paris (9e), not later than May 15th, 1933. They must be written in French. All information concerning the competition may be obtained from the Society at the above address.

St. Mary's Hospital Institute of Pathology.

A course of lectures on Pathological Research in its relation to Medicine will be given at the Institute of Pathology and Research, St. Mary's Hospital, London, W., at 5 P.M., on Tuesdays from April 26th to June 14th. Sir Almroth Wright, F.R.S., principal of the Institute, in opening the series, will speak on a New Body of Immunological Doctrine. The subsequent speakers will be Dr. Hugh Cabot, of the Mayo Clinic, on the Present Position of Transurethral Prostatectomy; Major Meurice Sinclair on Fractures of the Lower Extremity; Prof. E. D. Adrian, F.R.S., on the Nervous Mechanism of Respiration; Prof. Martin Hahn, of Berlin, on the Lübeck Trial and the Scientific Principles involved in Calmette's Inoculations; Dr. Donald Hunter, on the Clinical Significance of Studies in Calcium Metabolism; Sir Henry Dale, Sec. R.S., on Recent Work on Hormones of the Circulation; and Prof. R. T. Leiper, F.R.S., on Helminth Migrations. The lectures are open to members of the medical profession and students without fee.

NOTES, COMMENTS, AND ABSTRACTS

EPIGASTRIC PAIN.*

BY T. C. HUNT, M.D., M.R.C.P.,
PHYSICIAN IN CHARGE OF OUT-PATIENTS, ST. MARY'S HOSPITAL.

EPIGASTRIC discomfort or pain, with or without a relationship to food, is commonly attributed to a primary gastric cause, but many other conditions may produce gastric disorder or gastric symptoms.

The diagnosis must therefore be made in the first place between three great groups of causes; (1) general diseases; (2) local diseases elsewhere in the abdomen; (3) primary gastric diseases. Full examination of the patient as a whole will generally exclude the first group; mild or severe heart failure, general arterio-sclerosis, renal disease, pulmonary tuberculosis, and tabes dorsalis, for example, can be excluded by a full clinical examination of every system in the body. The commonest non-gastric abdominal lesions to cause epigastric pain and discomfort are cholecystitis, appendicitis, and colitis. The symptoms alone may not always be sufficient to differentiate these, but careful inquiry into actual colic, jaundice, right iliac or hypochondriac pain, pyrexia, or relation of the pain to defæcation or passage of flatus may help.

If, however, the condition appears to be gastric without features suggesting disease elsewhere in the abdomen, there are four main possibilities: (1) carcinoma; (2) ulceration of the stomach or duodenum; (3) gastritis; (4) primary nervous or functional disorder of the stomach with or without secondary gastritis. I propose to consider a few points only in the diagnosis of these four conditions.

Carcinoma.

The typical picture of carcinoma ventriculi is so well known that I shall only refer to one or two special symptoms. Carcinoma must, of course, be suggested at once by any freshly commencing indigestion in a patient over 40. It is not, however, very uncommon for growth to appear after a long history of dyspepsia due to gastritis, so that the length of history is not in itself any proof that the condition is non-malignant. Secondly, pain—at least at first—is far less common than mere discomfort, which is apt to be marked soon after meals, but may persist even when food is withheld. The anorexia found with it is too well known to require any comment. Severe pain, nausea, and vomiting are generally late symptoms.

A palpable tumour in carcinoma of the stomach is a late sign. It is often possible, however, to feel a small pyloric growth when the patient is standing, even if it is impalpable lying down; examination in the erect position is a useful aid in diagnosis. The radiologist, when screening a patient standing, not infrequently feels a lump which has not been felt by the physician examining his patient on the couch. On the other hand, in general, the larger the primary stomach growth the fewer the metastases, and vice versa, so that a large growth does not necessarily mean an inoperable one. Even when seen at operation, tumours are apt to be deceptive, as in a case I saw recently.

A tumour of the pylorus was found to be inoperable as long ago as 1896 by one of the surgeons in this hospital, and the patient brought to me in 1931 an excellent account of his case, shown in 1897 at a medical meeting in London, emphasising the remarkable benefit to be gained by gastro-enterostomy with a Murphy's button in restoring nutrition in hopeless cases of malignant pyloric obstruction! It was, of course, a cicatricial pyloric ulcer, and the patient is quite well to-day, having had no further gastric symptoms.

There are three less widely recognised symptoms that may occur early and are worthy of comment: bleeding and anæmia, fever, and thrombosis.

(1) *Bleeding* is very frequent in the shape of slight continuous loss without any gross hæmatemesis or melæna. It can often only be detected by the chemical tests for occult blood, the stools appearing normal to the naked eye. Unsuspected bleeding may lead to anæmia, which is not uncommonly the predominating symptom. *Any unexplained anæmia, with or without abdominal symptoms or wasting in a man over 40, should at once raise a suspicion of gastric carcinoma.* The appearance of the patient often resembles pernicious anæmia. There may be nothing abnormal to feel in the abdomen, as in the following case.

Male, aged 58. Weakness and dyspnœa for five months. No indigestion except for one day seven months previously. No pain or vomiting. Appetite good. Very pale. Blood count, 3,600,000 red cells; hæmoglobin, 40 per cent. Achylia gastrica. No abdominal tumour felt. Occult blood present. Post mortem small pyloric carcinoma with secondary deposits in lungs.

On the other hand, there may be a large tumour which may be mistaken for a spleen, as in the following case.

Male, aged 58. Phlebitis both legs, and œdema ten months. No anorexia; no epigastric discomfort or pain. No vomiting. Weakness and pallor six months. Blood count 4,400,000 red cells; hæmoglobin, 50 per cent. Large tumour in left hypochondrium at first thought to be splenic. X ray: extensive carcinoma of body of stomach. Occult blood present.

(2) Some *fever* is quite common—generally of a low intermittent type, so that occasionally the case resembles that interesting disease, "P.U.O." Any serious degree of fever is highly suggestive of metastases in the liver, of which it is a very frequent (some say a constant) feature.

(3) *Peripheral venous thrombosis* is very suggestive. An apparently unexplained femoral thrombosis, especially if other thromboses occur elsewhere, in a patient over 50 is sometimes evidence of gastric carcinoma. Thromboses may be so frequent as to constitute the condition described as thrombo-phlebitis migrans, in which visceral as well as peripheral thromboses occur. Some fever is generally present. It is not at all uncommon for the thrombosis to withdraw attention entirely from any digestive symptoms. I have recently seen three patients at the hospital in which recurring phlebitis was the only symptom complained of; in two of them nothing in the history pointed towards a gastric carcinoma.

Peptic Ulcer.

Anxiety neurosis, neurasthenia, worry, strain, and emotions may cause marked dyspeptic symptoms of purely nervous origin. In such cases the indigestion is generally found, on careful questioning, to follow primary nervous symptoms; the nervousness has not followed the indigestion. At the same time, any fairly long-standing nervous disorder of the stomach may, through the secretory and motor irregularities produced, lead to a true organic catarrh or gastritis. In practice, therefore, we are forced to the diagnosis of gastritis and nervous indigestion by a process of exclusion, in which the possibility of ulcer must take first place.

HISTORY.

The typical history of the intermittent pain of peptic ulceration is too well known to require comment. It is important to remember, however, certain points about this history. In the first place it is generally pain and not discomfort that occurs—pain that may be severe and intense, and pain that makes a patient frightened of getting it again. Thus, even in his free periods, the ulcer patient is generally careful of his diet, whereas the chronic appendix or colitis patient, for instance, is apt to forget all restrictions when the pain is not present. Ulcer is

* Based on a lecture delivered at the St. Mary's Hospital Post-graduate Course.

certainly the commonest cause of stomach pain, and must be considered in every doubtful case of chronic indigestion, however atypical. The pain is particularly apt to go through to the back, where there may occasionally be found an area of reflex hyperæsthesia close to the spine in the tenth, eleventh, or twelfth intercostal spaces. Ulcer pain does not always show the classical relationship to meals, and Hurst [1] says that in half the cases of gastric ulcer the history is not characteristic.

On the other hand, the pain tends to be fairly *constant* in character and site.

CONSTANCY.

Thus the ulcer patient when questioned will usually point out his most tender spot with one or two fingers; other patients, particularly cases of nervous indigestion, will generally use the whole hand and move it over a large area of the upper abdomen. Ulcer patients will nearly always give the same story on different occasions; other patients may give almost completely different accounts of their troubles each time they are questioned.

The age of onset of the symptoms is important and may need very careful questioning—not more than 10 per cent. of ulcers begin before the age of 20, so that a long-lasting indigestion beginning before this age is unlikely to be due to ulcer, and is perhaps most commonly due to a chronic appendicitis, which so often begins with an acute attack in early adult life.

Taking ulcers as a whole, probably between 4 and 5 to 1 occur in males, particularly of course the duodenal ulcers, and a great proportion appear to begin between the age of 30 and 35.

Nausea is not common with ulcer, but is more suggestive of large bowel or gall-bladder disorder. It should always, I think, make us suspect a chronic appendix, cholecystitis, or colitis rather than a lesion of the stomach itself. *Vomiting* is also probably as common in cholecystitis as it is in peptic ulcer. *Water-brash*, on the other hand, is very suggestive of a gastric lesion, and seems particularly common with duodenal ulcer. It is not so often a nervous phenomenon as is generally believed.

It must be remembered that *neurosis* is a highly frequent associate of ulcer, and it is remarkable how much affected are the symptoms of ulcer by worry, anxiety, and fear. Ulcers are not indifferent to psychic states any more than they are indifferent to season and climate. It is very easy to be deceived into thinking that an organic lesion could not possibly be so seriously affected by mental states as patients sometimes say their symptoms are.

One patient whom I saw recently was an extremely neurotic schoolmaster who told me that after interviewing parents about their boys he was always prostrated with intense epigastric pain and profuse vomiting for several hours. He had been invalided from the Army with neurasthenia and had seen numerous boards since and continued to draw a pension. His radiogram shows a very large penetrating gastric ulcer and a probable duodenal ulcer as well.

The pain of ulcer is particularly apt to *wake patients at night*, and pain which awakes patients who have once fallen to sleep must always be regarded as organic unless completely proved otherwise. On the other hand, pain which begins when patients go to bed and prevents them getting to sleep, is often non-organic, since the quiet in bed allows a nervous patient to think more of his symptoms and may enormously exaggerate his condition. Pain which is made worse or prevents a patient *lying on the left side in bed* is also suggestive of duodenal ulcer, and I think this may be due to the weight of the liver dragging on the first part of the duodenum and stretching the ulcer surface, perhaps with adhesions. It is rather rare for ulcer pain to be present first thing in the morning before any food is taken, whilst colon and chronic appendix discomfort is often felt at that time. Ulcer pain is not, as a rule, affected by defæcation, the passage of flatus or the use of purgatives, whilst "bowel" pain often is.

THE CAUSE OF ULCER PAIN.

We are apt to attribute all forms of gastric sensations to acidity, and to speak of hyperacidity as a type of indigestion and a cause of pain in itself. The pain is not, however, closely related to the gastric acidity.

Hardy [2] showed that the administration of hydrochloric acid to ulcer patients, as was suggested as a diagnostic test, gave a variable pain response, often causing no pain and, vice versa, sometimes causing pain though no ulcer was present. The relief of pain following diet or alkalis is probably largely independent of the gastric acidity. I have found, for instance, in ulcer patients that an egg and milk feed with subsequent withdrawal of the stomach contents has revealed almost as high an acidity as that found after giving a strong caffeine test-meal. The two following cases show this clearly. In the first a penetrating ulcer of the lesser curvature was present, and shown without question by X rays. In the second there was a duodenal ulcer.

CASE 1. (*Gastric ulcer.*)

	Free acid.		Total acidity.		Total chlorides as g. HCl per cent.
	c.cm. N/10 NaOH.				
Stomach acidity at 1 hr. after—					
(*a*) Caffeine test-meal	34	.....	50	.....	0·320
(*b*) Lenharz feed (3 vl egg and milk) ..	25	.....	75	.....	0·380

CASE 2. (*Duodenal ulcer.*)

Stomach acidity after					
(*a*) Caffeine test-meal (1 hour)	30	.....	48	.....	0·190
(*b*) Lenharz feed (1 hour)	44	.....	90	.....	0·430
(*c*) Lenharz feed (3 hours)	38	.....	64	.....	0·380

It is also certain, as J. F. Venables [7] and A. F. Hurst have shown, that gastric acidity may be higher after the cure of an ulcer by diet and alkalis, when all symptoms have gone, than before treatment when an active ulcer was present. Such terms as hyper- or hypo-acidity can therefore have no real meaning as definite diagnoses of "indigestion." They can be merely variations in function which may often have no relation to the symptomatology. The gastric acid is apt to be blamed for almost all types of indigestion, but chemical analyses of test-meal results can never alone afford a complete diagnosis, and have relatively little value except as confirmatory in duodenal ulcer, carcinoma of the stomach, pernicious anæmia, and gastritis. I am confident that the majority of cases of gastric hypersecretion characterised by pain late after meals—sometimes described as Reichmann's disease—are in fact due to pyloric gastritis, duodenitis, or very often to an actual ulcer.

Just as the highest gastric acidity may be present without symptoms, so may complete absence of hydrochloric acid lead to no indigestion whatever, as is well known. The following case illustrates this well.

The patient was a man of 47, who for 18 months had complained of fatigue, loss of weight, and anorexia, but of no digestive or other symptoms whatever. In view of the anorexia and loss of weight, a radiogram of the alimentary tract had been made, but had shown no abnormality. The stools had also been examined, and a large excess of muscle-fibres found, some eight months previously. Pancreatic insufficiency was suspected, but there had been no improvement with treatment by pancreatin. I thought that the creatorrhœa might be due to a peptic deficiency in the stomach and carried out a test-meal which showed complete achlorhydria and almost total lack of pepsin. Further examination of the blood showed the case to be one of pernicious anæmia, and complete cure resulted with liver treatment and hydrochloric acid. In this case, therefore, there must have been complete failure of gastric digestion—but with normal peristalsis and tone as shown by the barium meal—for many months without any digestive symptoms (except loss of appetite).

Again, typical ulcer pain may be produced by purely mechanical motor irregularities, as is shown by the following case. The patient came to the out-patient department with a story of two and a

half years' "indigestion" in intermittent attacks, causing epigastric pain one half to one hour after meals with vomiting which eased the pain, and temporary relief from sodium bicarbonate. Her symptoms were due to a large cystic tumour of the left kidney deforming the stomach and entirely disappeared when this was removed; they have not recurred.

Ulcer pain may persist in spite of apparently careful dieting by the patient himself. On the other hand, such dieting is usually quite inefficient. A rough rule, and one that is of real assistance in diagnosis, is that *pain which is not relieved by two-hourly feeds of egg and milk is almost certainly not due to uncomplicated ulcer*. The patient is put to bed for 24 hours and given 5 oz. feeds, every two hours by day and every three hours by night, of the following mixture, which is easily made at home:—

Milk	2 pints.	Eggs	4
Water ..	½ pint.	Sugar	3ii

Almost every case of ulcer is relieved of pain almost immediately—even when quite considerable pyloric obstruction may be present. The vomiting of ulcer is also frequently stopped as if by magic. If the pain remains unaltered its cause is either other than ulcer or there is some definite complication, such as adhesions or chronic perforation. In the great majority of cases the patient will be entirely free of symptoms in 24 hours.

The frequency of the feeds rather than their exact composition is probably the most important factor. If there is no change in the pain it is probably due to some non-gastric cause such as chronic appendicitis, colitis, or cholecystitis. With carcinoma of the stomach the pain may persist in spite of this diet, but often it is relieved, which is perhaps unfortunate from the point of view of diagnosis. The following cases illustrates this point.

A man, aged 47. Periodic attacks of epigastric pain, about half an hour after food, for nine years. No vomiting. Radiological examination showed a six-hour residue in the stomach with an ulcer almost certainly present on the lesser curvature. Occult blood was present in the stools. He was entirely relieved of symptoms by ulcer diet alone and remained free for four months. Then a return of pain about two hours after meals occurred, even with the diet, and Mr. Z. Cope kindly saw him and explored the abdomen. An inflamed appendix with concretions was found but no ulcer in stomach or duodenum. In view of the X ray and the blood in the stools, I think there can be no doubt that an ulcer had been present on the first occasion and had been cured, whilst the appendix had been entirely quiescent. On the second occasion the appendix had been causing the symptoms (which were somewhat different from those of the previous attacks).

Examination.

It is rare to find a wholly negative result if ulcer is present, even in its quiescent stage. There is almost always a definitely localised point of tenderness on deep pressure, and this point is generally painful on pressure even between the attacks and is often of no greater size than a shilling. Its discovery is a most important piece of evidence. It should be sought by pressure with one finger-tip with equal firmness area by area. Mid-line tenderness is less significant than tenderness to the side, but the site varies considerably, corresponding almost certainly to the ulcer itself, as Morley [3] and others have shown by marking it with a lead circle and radiographing the stomach with a barium meal. The mechanism of its production is a subject of extreme interest, but it is probably caused by peritoneal pressure over the ulcer area. Clinically it is well to define this point precisely when it is found and to mark it with a pencil and check it later on in the examination and, if possible, on one or two subsequent occasions. If due to ulcer it will be found to remain constantly in the same spot, but to sink perhaps an inch downwards in changing from the horizontal to the vertical position. Unlike gall-bladder tenderness it does not move with respiration. This tender spot is of the greatest possible significance in the diagnosis of ulcer, even when history or other evidence is inconclusive. It may be associated with the small area of hyperæsthesia at the back, close to the spine at about the tenth, eleventh, or twelfth ribs on the right side, but reflex bands of hyperæsthesia are very seldom found with ulcer. Mid-line tenderness is often due to pressure over the aorta, and diffuse tenderness in the epigastrium, not localised particularly to one small site, is far less suggestive, and may be present with gastritis or colitis.

Even with the most careful history and clinical examination, it is not always possible to differentiate certainly between ulcer, growth, and cholecystitis or chronic appendicitis. X ray examination will show an ulcer in at least 90 per cent. of cases, and chronic gall-bladder disease in perhaps three-quarters of the cases; a barium meal and enema may afford useful confirmatory evidence of chronic appendicitis; a test-meal can assist in differentiating duodenal ulcer from a chronic atrophic gastritis, and a biliary drainage can help to elucidate gall-bladder disease.

GASTRITIS.

It is, as a rule, only wise to diagnose gastritis, whether primary or secondary to neurosis, after the most thorough process of exclusion. We find, however, by such methods that it is far more frequent than is sometimes believed. In fact, it is probably very common. This has been more clearly shown since the wider use of gastroscopy, and may be still further demonstrated by gastro-photography. In England we, like Sauerbruch, are apt to regard gastroscopy as more dangerous than an exploratory laparotomy, but on the Continent valuable knowledge has been gained by its use, and many writers—like Henning [4] record results in 500 or more cases without ill-effects.

Thus we know, for instance, that gastro-enterostomy is very frequently followed by gastritis, probably due to the regurgitation of bile and intestinal juices into the stomach, which is a commoner cause of persistence of gastric symptoms after this operation than are the adhesions which are more generally diagnosed. Gastritis is almost constant with ulcer and with carcinoma, and follows the use of many chemical substances—e.g., alcohol. Long use of drugs such as digitalis, bromides, and aspirin also produces gastritis.

In general, gastritis is of two types, though it must be admitted that the clinical symptoms and the anatomical changes do not always run parallel. These types may be called the hypertrophic and the atrophic, though the latter may often follow the former. They correspond approximately to the types of hypersthenic and asthenic, or—in terms of secretion only—of hyperacid and hypoacid, though secretion curves do not correspond exactly to the anatomical changes. In the former the mucous membrane is engorged and swollen, often with multiple small erosions and sometimes actually polypoid overgrowths. In the latter the mucous membrane is thin and pale; in both a large amount of mucus is apt to be present.

It is possible that the treatment of gastritis is in some measure a preventive treatment of both ulcer and carcinoma, for an associated gastritis is almost always found. Some workers even regard ulcer as a "complication" of gastritis, and I feel sure that duodenitis without actual ulcer is common. It is most often due to chemical irritation, rather than actual bacteria, although in a number of suspicious cases I have found an abnormal growth of organisms in the duodenal content which, in health, is usually sterile. The gastritis accompanying ulcer is usually situated mainly at the pylorus and often shows small polyps with superficial erosions; the gastritis of congestive heart failure is generalised and shows a very great excess of mucus. Atrophic gastritis is in general less productive of local symptoms than the hypertrophic type.

Alcohol tends at first to cause a hypertrophic gastritis and later an atrophic or "anacid" type.

The latter is often found also with bad oral sepsis, poor mastication, and old age. It is frequently accompanied by dirty tongue and a bad taste in the mouth; sometimes by anæmia, acne rosacea, urticaria, arthritis, and "dyspeptic" ulcers in the mouth. The appetite is poor, and thirst is often a marked symptom. The condition is apt to be polysymptomatic, and patients often complain of fatigue, lassitude, headache, and insomnia. Any real epigastric pain is rare. I think some of these cases are due to a constitutionally weak stomach which shows peculiar idiosyncrasies to certain articles of food. In some the condition dates from one of the infective fevers or influenza, in which an endogenous or blood-borne gastritis may have occurred and led to deficient motor activity and hyposecretion.

In the hypertrophic or ulcer type, on the other hand, the appetite is usually good, though the patient may be afraid to eat; the tongue is clean, and the symptoms are essentially abdominal or monosymptomatic.

Treatment.

There are two broad lines of treatment: sedative or stimulant, in other words, a therapy directed towards lessening gastric activity or towards increasing it. The first is required for ulcer patients, for acute and subacute gastritis, and as a palliative treatment in the reflex hyperactivity associated (in the early stages at least) with cholecystitis or appendicitis. The latter is of use for long-standing gastritis, of the toxic or atrophic type; in cases where loss of tone and fatigue is a feature, as in convalescence after the toxic gastritis of fevers; in old age; often in the dyspepsia of tuberculosis and in that found commonly in nervous girls which German authors describe well as a "stomach strike."

In the ulcer régime the diet required is not necessarily fluid but non-stimulating, that is, one which calls forth a minimum of motor as well as secretory activity. Not uncommonly, the diet ordered alternates Bovril with Benger's food, their only common feature being that they are both fluid! The following list is not in any way original, or more than an outline of dietetic treatment. The "egg and milk diet" is that mentioned above; it may be used early in treatment but requires variation according to the stage of healing of the ulcer.

SEDATIVE (ULCER) RÉGIME.

2 pints milk.	4 eggs.
½ pint water.	2 teaspoonfuls sugar.

Five-ounce feeds, 2-hourly by day, 3-hourly at night.

Avoid pickles, curry, spices, vinegar; Acid fruits (especially raw); lemon-juice; fruit with pips, e.g., currants, raisins, figs; peel, e.g., in cake or marmalade; nuts; coarse vegetables, e.g., celery, lettuce; strong meat soups, broths, Bovril, or extracts. Tough meat or high game. Strong tea or coffee. All alcoholic spirits; any alcohol on an empty stomach.

Take especially eggs, egg-dishes, milk and milk foods, custards, junket, jellies. Butter, cream, soft puddings. Plain biscuits, cake, toast, rusks—not new bread. Purées of vegetables and sweet fruits. Fish—not very salted. Meat—not more than once a day, preferably rabbit, lamb, chicken, veal.

Do not go longer than 2 to 2½ hours without a feed.

In addition to diet, alkalis, belladonna, and olive oil are all valuable.

Of the *alkalis*, sodium bicarbonate has had some unkind things said about it but still holds a most important place in treatment. Its actions are essentially: (1) to neutralise acid with (2) the liberation of carbon dioxide; (3) to dissolve mucus; (4) to cause a secondary stimulation of gastric juice; (5) to relax muscle spasm; and probably (6) to relax the pylorus and thus increase the rate of emptying of the stomach.

There is fairly definite evidence that sodium bicarbonate relaxes pyloric spasm, and possibly hypertonicity of the stomach in general. On the other hand, the liberation of carbonic acid gas tends to stimulate peristalsis, and so to hasten stomach emptying time. The third and fourth functions of dissolving mucus and stimulating gastric secretion are clearly valuable in cases of gastritis where mucus coats the stomach and hyposecretion is present, in which case it should be given some 30 minutes before food. As a pure neutraliser of acid, sodium bicarbonate is better replaced by calcium carbonate, magnesium or the citrates, as in the powders I use which I call "Pulv. 1333"—containing one part of sodium bicarbonate and three parts each of precipitated calcium carbonate, the light magnesium oxide and oxycarbonate of bismuth.

Atropine is most valuable as a gastric sedative, for it not only lessens secretion and in large doses actually inhibits it but, by acting on the vagus and the nerve plexuses in the wall of the stomach, it also lessens pyloric spasm as well as gastric tone and peristalsis. Radiological evidence upon the inhibitory action of atropine is not wholly conclusive, but its effect on the secretory curves of test-meals is unquestioned. Dryness of the mouth is a sign that some "drying" of the stomach is occurring. Atropine must be given in good dosage: as tr. belladonna, ℥v. to xv., or as atropine sulphate, gr. 1/150 to 1/200 in a drachm of water.

Olive oil is also a very valuable gastric sedative when taken alone, for it powerfully inhibits both the secretory and motor activity of the stomach. This property has been demonstrated experimentally (Roberts [3]), and is in virtue simply of its being a vegetable fat and is not in any sense specific. It must be given alone, since a combination of fat and protein—as for instance fish fried in oil—has a very different effect. The inhibitory effect of olive oil upon stomach activity is produced after its entrance into the duodenum, and since it has a markedly stimulant action upon biliary secretion it is mildly laxative; its high food value in under-nourished patients is particularly valuable. It is best given before meals and last thing at night in tablespoonful doses. If four doses are given in the day an energy value of about 500 calories is obtained—approximately a quarter of that needed for an average individual.

The strong carminative spirits of the pharmacopœia produce a temporary "paralysis" of the stomach, relaxing motor activity, but are followed by an increased secretion and augmented peristalsis. They should be avoided for anything but temporary use in relieving the severe pain of irregular peristalsis, and should never be ordered for prolonged use as gastric sedatives, particularly in ulceration.

"STIMULANT" TREATMENT.

A varied diet may be given, but milk and fatty foods are generally badly taken. Meat extracts, light wine, tea and coffee are all excitant to the stomach and are useful; some such fluid with meals is often helpful.

Sodium bicarbonate is valuable for freeing mucus and causing a reactionary secretion of gastric juice. It should be ordered before meals with a bitter such as inf. gent. co. which tends to stimulate the psychical secretion and activity of the stomach.

Strychnine has been demonstrated to increase the tone and peristalsis of the stomach, and may be given as liq. strych. ℥ii. to v. or the tr. nux vom. ℥v. to xv. It is best given after meals.

Hydrochloric acid is somewhat disappointing when ordered alone but should be tried in full doses; ℥xxx. to lx. of the dilute acid with or after meals; ℥i. of the glycerin of pepsin should be added to correct a possible ferment deficiency. Strychnine or nux vomica may well be added to this mixture, so that some such prescription as the following may be ordered.

℞	Ac. nitro-hydrochlor. dil.	℥xxx.
	Glycerini pepsini	ʒi.
	Tr. nuc. vom.	℥v.
	Inf. gent. co. ad	ʒi.

Such a mixture is often efficacious in the treatment of gastritis when the acute stage is past and the sedative régime has been carried on long enough or, as not infrequently happens, too long.

Tobacco is definitely stimulative to gastric secretion and in some cases appears to excite peristalsis. Gray [6] carried out some experiments on the effects of smoking before a barium meal and before and during a test-meal in 50 cases of duodenal ulcer, and found both an increased acidity and increased peristalsis when tobacco was taken on a fasting stomach. Other experiments have also shown the same effect. Tobacco chewing is a powerful gastric stimulus and can indeed lead to a definite gastritis. I think in a few cases nicotine is a cause of irregular motor activity and spasm in the colon also, so that attacks sometimes described as "abdominal angina" may be produced, as may perhaps (though rarely) pyloric spasm as well. It has unfortunately been shown that the so-called nicotine-free cigarettes or those with varying types of filter have no less nicotine in their smoke than other cigarettes and are therefore probably no less stimulant than others.

Alcohol has important actions upon digestion. Many ulcer patients notice that they are afforded temporary relief by brandy whereas more dilute alcoholic drinks upset them very much. This is due to the fact that a concentration of alcohol in the stomach greater than about 15 per cent. usually causes almost a temporary paralysis with diminution of peristalsis and tone and a checking of secretion. Lesser concentrations have a markedly stimulant action upon both peristalsis and acidity. Undiluted brandy as a treatment for peristaltic unrest is therefore not very different from the mixture which is generally called mist. carminativa, made up of spir. chloroform, spir. cajuput, and the like. These contain about 90 per cent. of alcohol, and the spir. æth. nitrosi is a most convenient way of prescribing alcohol when there are prejudices against ordering it as such.

Tea and coffee are fairly powerful excitants of gastric secretion. A cup of strong coffee contains between one and two grains of caffeine and causes a copious secretion of gastric juice, but weak China tea with milk has a far less stimulant effect. Again, it is disappointing to find that the so-called caffeine-free preparations of coffee show little difference in this activity. Food taken with tea appears experimentally to be less well digested than when taken without.

REFERENCES.

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2. Hardy, T. L.: THE LANCET, 1929, i., 711.
3. Morley, J.: Abdominal Pain, Edinburgh, 1931.
4. Henning, N.: Med. Klin., 1931, xxvii., 269.
5. Roberts, W. M.: Quart. Jour. Med., 1931, xxiv., 133.
6. Gray, I.: Amer. Jour. Surg., 1929, vii., 489.
7. Venables, J. F.: Proc. Roy. Soc. Med., 1929, xxii., 1047.

Vacancies

For further information refer to the advertisement columns.

Atrincham General Hospital.—Jun. H.S. At rate of £120.
Aylesbury, Royal Buckinghamshire Hospital.—Res. M.O. At rate of £200.
Barry U.D.C. Surgical Hospital.—H.S. £200.
Beckenham, Kent, Bethlem Hospital, Monk's Orchard, Eden Park. Res. H.P. At rate of £200.
Birmingham, Dudley-road Hospital.—Gynæcologist and Obstetrician. £750. Also Jun. Asst. Res. M.O.'s. At rate of £200.
Birmingham, Little Bromwich Hospital for Infectious Diseases.—Jun. Asst. M.O. £300.
Blackburn Royal Infirmary.—Res. H.P. and 4th H.S. £175 and £150 respectively.
Bolingbroke Hospital, Wandsworth Common, S.W.—H.S. At rate of £120.
Brighton, Hove and Preston Dispensary and Hove Hospital, Sackville-road.—Hon. Physician.
Brighton, Royal Alexander Hospital for Sick Children.—H.P. £100.
Brighton, Steyning Institution.—Asst. M.O. £250.
Bristol Eye Dispensary.—Hon. Ophth. Surgeon.
British Hospital for Functional Mental and Nervous Disorders, 72, Camden-road, N.W.—Hon. Physician.
Burton-on-Trent, General Infirmary.—Cas. O. and H.P. £150.
Cancer Hospital, Fulham-road, S.W.—H.S. At rate of £100.
Cambridge, Addenbrooke's Hospital.—H.P. At rate of £130.
Canterbury, Kent and Canterbury Hospital.—H.P. At rate of £125.
Chester, East Lanchashire Tuberculosis Colony, Barrowmore Hall, Gt. Barrow.—H.S. At rate of £100.
Derby, Derbyshire Hospital for Sick Children.—Res. H.S. At rate of £130.
Derby, Derbyshire Royal Infirmary.—H.S. for General Surgery. £150.
Dover Borough.—Asst. M.O.H. £650.
Durham County Hospital.—Two H.S.'s. Each £150.
Eastbourne, Princess Alice Memorial Hospital.—Res. H.S. At rate of £150.
Elizabeth Garrett Anderson Hospital, 144, Euston-road, N.W.—Pathologist. £300.
Evelina Hospital for Sick Children, Southwark, S.E.—Hon. Physician to Out-patients. Also Cas. and Out-patient Officer. At rate of £120.
Exeter, Devon County Council.—School Medical Inspector. £500.
Halifax Royal Infirmary.—Third H.S. At rate of £150.
Harrogate Infirmary.—Jun. H.S. At rate of £140.
Hastings, Royal East Sussex Hospital.—Jun. H.S. At rate of £100.
Hospital for Consumption and Diseases of the Chest, Brompton, S.W.—H.P. At rate of £50.
Hospital for Epilepsy and Paralysis, Maida Vale, W.—Res. M.O. and H.P. At rate of £150 and £100 respectively. Also Med. Reg. £100.
Hospital for Sick Children, Great Ormond-street, W.C.—Secretary. £750.
Ilford, King George Hospital.—H.S. At rate of £100.
Ipswich, East Suffolk and Ipswich Hospital.—H.S. £120.
Johannesburg Hospital, South Africa.—Radiologist. £1500.
Kidderminster and District General Hospital.—H.S. £150.
Lancaster Royal Infirmary.—Sen. and Jun. Res. H.S.'s. £175 and £130 respectively.
Leeds, Jewish Herzl Moser Hospital, Leopold-street.—R.M.O. £200.
Liverpool, Smithdown-road Hospital.—Res. Asst. M.O.'s. £200.
London Clinic and Nursing Home, Ltd., 20, Devonshire-place, W. Res. H.S. At rate of £200.
London University.—University Chair of Physiology. £1100.
Manchester, Ancoats Hospital.—Med. Reg. for Out-patient Dept.
Manchester, Royal Children's Hospital, Pendlebury.—Res. M.O. At rate of £125.
Manchester, St. Mary's Hospitals.—Three H.S.'s. Each at rate of £50.
Middlesborough, Holgate Municipal Hospital.—Res. H.P. At rate of £170.
Miller General Hospital, Greenwich-road, S.E.—Hon. Asst. Surgeon to Genito-Urinary Department.
Minehead, Somerset, Minehead and West Somerset Hospital.—Res. M.O. At rate of £150.
Newcastle-upon-Tyne, Hospital for Sick Children.—H.P. and Sen. and Jun. H.S.'s. Each at rate of £100.
Northampton General Hospital.—H.S. to Ear, Nose and Throat Dept. At rate of £150.
Oldham Royal Infirmary.—H.S. £175.
Portsmouth, Royal Hospital.—Cas. O. At rate of £100.
Preston, Lancashire County Council.—Asst. County M.O. £800.
Preston, Wrightington Hospital, Parbold.—Jun. Asst. M.O. £200.
Reading, Royal Berkshire Hospital.—H.P., Cas. O. and Res. M.O. Each at rate of £150.
Rochdale Infirmary and Dispensary.—Jun. H.S. £200.
Royal College of Surgeons of England.—Election of Examiners in Anatomy, &c.
Royal Eye Hospital, St. George's Circus, Southwark, S.E.—Sen. and Jun. H.S. At rate of £150 and £100 respectively.
Royal Free Hospital, Gray's Inn-road, W.C.—Sen. Res. M.O. £150.
Royal Northern Hospital, Holloway, N.—H.S. At rate of £70 Also H.P. At rate of £70.
Ryde, Royal Isle of Wight County Hospital.—Hon. Ophth. Surg.
St. John's Hospital, Lewisham, S.E.—Res. Cas. O. At rate of £100.
St. Olave's Hospital, Lower-road, Rotherhithe, S.E.—Res. H.P. At rate of £80.
Salford, Hope Hospital.—Res. M.O. £400.
Salvation Army, Mothers' Hospital, Lower Clapton-road, Clapton, E.—Jun. Res. M.O. At rate of £60.
Sheffield, Jessop Hospital for Women.—Secretary. £450.
Sheffield Royal Hospital.—H.S. and Res. Anæsthetist. Each at rate of £80.
Southport General Infirmary.—Jun. H.S. £150.
Sutton, Surrey, Sutton and Cheam Hospital.—Res. M.O. At rate of £150.
Watford, Herts, Peace Memorial Hospital.—Res. H.S. At rate of £150.

QUEEN'S HOSPITAL, BIRMINGHAM.—The income last year was £45,109, an increase of £3717; the expenditure was £48,425, a decrease, compared with the previous year, of £2637. The debt is £18,598. The full year's income from private paying patients was £2435. Last year there were 5268 in-patients, 13,753 out-patients, and 16,572 casualties, a considerable reduction in the two latter categories. In-patients cost £2 18*s.* 7½*d.* per week, as compared with £3 1*s.* 2*d.* in the preceding year; the average cost per bed was £152 15*s.* 11*d.*, as against £159 7*s.* 10*d.* in 1930. Each out-patient cost 4*s.* 3½*d.* in place of the former 5*s.* At the beginning of the year arrangements came into force requiring patients to contribute according to their circumstances; the sum thus received from in-patients was £1664, and from out-patients £947. The amount received from the contributory scheme was only 48 per cent. of the cost of its patients. The stock of radium has been increased from 300 to 340 milligrammes, and has been freely used with encouraging results.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
MONDAY, April 11th.—4.30 P.M., UNITED SERVICES. Annual General Meeting: Election of Officers and Council. Surg.-Commander W. H. Edgar: Scarlet Fever, an Effort in Preventive Medicine.
TUESDAY.—8.30 P.M., PSYCHIATRY. Dr. David Forsyth: The Place of Psychology in the Medical Curriculum.
FRIDAY.—5.30 P.M., PHYSICAL MEDICINE. Sir Robert Jones: Manipulation as a Therapeutic Measure. RADIOLOGY. There will be no Meeting of the Section on this day. 8 P.M., PHYSICAL MEDICINE and RADIOLOGY. 8.15 P.M., OBSTETRICS AND GYNÆCOLOGY. Short Communications. Mr. D. H. MacLeod: Two Cases of Struma Ovarii. Mr. Victor Bonney: Two Cases of Implantation Endometriomata. Papers: Prof. Leith Murray: Ectopic Gestation as seen by the Gynæcologist; An Analytical Study of 146 Cases. Dr. A. A. Gemmell and Prof. Leith Murray: Two Cases of Simultaneous Intra- and Extra-uterine Pregnancy.

HARVEIAN SOCIETY.
THURSDAY, April 14th.—4.30 P.M., Clinical Meeting at King's College Hospital.

PADDINGTON MEDICAL SOCIETY.
TUESDAY, April 12th.—9 P.M. (at the Great Western Royal Hotel, Paddington, W.), Debate on a State Medical Service, to be opened by Mr. Somerville Hastings and Sir Ernest Graham Little, M.P. Non-members invited.

MEDICAL SOCIETY OF INDIVIDUAL PSYCHOLOGY, 11, Chandos-street, Cavendish-square, W.
THURSDAY, April 14th.—8.30 P.M., Dr. H. C. Squires: A Novice's Impressions of the Theory and Practice of Individual Psychology.

SOUTH-WEST LONDON MEDICAL SOCIETY, Bolingbroke Hospital, Wandsworth Common.
WEDNESDAY, April 13th.—9 P.M., Mr. C. Rowntree: Common Diseases of the Mouth.

SOCIETY FOR THE STUDY OF INEBRIETY.
TUESDAY, April 12th.—4 P.M. (in the Rooms of the Medical Society of London, 11, Chandos-street, W.), Annual Meeting. Dr. J. D. Rolleston will open a discussion on the Cigarette Habit.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.
FRIDAY, April 15th.—5 P.M., Dr. R. Fortescue Fox and Dr. G. R. Bruce: The Provision of Medical Baths by Local Authorities.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, April 11th, to SATURDAY, April 16th.—QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, E. Post-graduate Course in Diseases of Children. All day.—LONDON LOCK HOSPITAL, Dean-street, W. Post-graduate Course in Venereal Disease. Every afternoon. (The above Courses are open only to Members.)—CHILDREN'S HEART HOSPITAL, West Wickham, Kent. Sat., 10.30 A.M. to 12 noon. Demonstration by Dr. Bernard Schlesinger on Rheumatic Infections and Heart Disease in Children.—Further particulars from the Fellowship of Medicine.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith-road, W.6.
MONDAY, April 11th.—10 A.M. to 1 P.M., Gynæcological Ward, Surgical Wards, Genito-Urinary Operations, Skin Department. 2 to 4 P.M., Operations, Surgical Wards. Medical, Surgical, Gynæcological, and Eye Out-patients. 4.15 P.M. (Lecture) Sir Henry Simson: The Management of Pregnancy and Labour.
TUESDAY.—10 A.M. to 1 P.M., Medical Wards, Surgical Demonstration, Throat Operations, Dental Department. 2 P.M. to 4 P.M., Operations, Medical, Surgical, and Throat Out-patients. 4.15 P.M. (Lecture): Mr. Tyrrell Gray: Visceroptosis in Relation to other Diseases.
WEDNESDAY.—10 A.M. to 1 P.M., Medical Wards, Children's Medical Out-patients, 2 P.M. to 4 P.M., Gynæcological Operations, Medical, Surgical, and Eye Out-patients. 4.45 P.M., Venereal Diseases Demonstration.
THURSDAY.—10 A.M. to 1 P.M., Neurological Out-patients, Fracture Demonstration. 2 P.M. to 4 P.M., Operations, Medical, Surgical, Genito-Urinary and Eye Out-patients. 4.15 P.M. (Lecture): Dr. Scott Pinchin: Diseases of the Bronchi.
FRIDAY.—10 A.M. to 1 P.M., Medical Wards, Skin Out-patients, Dental Department. 12 noon, Medical Lecture. 2 P.M. to 4 P.M., Operations, Medical, Surgical, and Throat Out-patients. 4.15 P.M. (Lecture): Mr. Alex. Roche: Indications for Cystoscopy.
SATURDAY.—9 A.M. to 1 P.M., Throat Operations, Medical Wards, Surgical and Children's Medical Out-patients. The lectures at 4.15 P.M., on Mondays, Tuesdays, Thursdays, and Fridays are open to all medical practitioners without fee.

LONDON JEWISH HOSPITAL, Stepney Green, E.
THURSDAY, April 14th.—4.15 P.M. Dr. M. Schwartzman: X Ray Demonstration.

ST. PETER'S HOSPITAL, Henrietta-street, Covent Garden, W.C.
WEDNESDAY, April 13th.—3 P.M., Mr. J. A. Andrews: Pre-operative Treatment of Enlarged Prostate.

ST. MARK'S HOSPITAL, City-road, E.C.
THURSDAY, April 14th.—4.30 P.M., Dr. J. B. Alexander: The Relationship of Tuberculosis to Anal Fistulæ.

CENTRAL LONDON THROAT, NOSE AND EAR HOSPITAL Gray's Inn-road, W.C.
FRIDAY, April 15th.—4 P.M., Mr. A. Ryland: Temporal Bone. (Lantern lecture.)

SALFORD ROYAL HOSPITAL.
THURSDAY, April 14th.—Dr. A. G. Bryce: Demonstration of Surgical Cases.

ROYAL SAMARITAN HOSPITAL FOR WOMEN, Glasgow.
WEDNESDAY, April 13th.—4.15 P.M., Dr. John Gardner: Gynæcological Cases.

ANCOATS HOSPITAL, Manchester.
THURSDAY, April 14th.—4.15 P.M., Dr. G. J. Langley: Treatment of Cardiac Vomiting.

MANCHESTER ROYAL INFIRMARY.
TUESDAY, April 12th.—4.15 P.M., Mr. P. R. Wrigley: Diagnosis and Treatment of Carcinoma of the Colon.
FRIDAY.—4.15 P.M., Mr. A. H. Southam: Demonstration of Surgical Cases.

Appointments

TAME, R. G., L.R.C.P. Lond., M.R.C.S., has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Cranborne District of the County of Dorset.

Births, Marriages, and Deaths

BIRTHS.

DIX.—On April 3rd, 1932, at a nursing home, to the wife o Victor W. Dix, F.R.C.S.—a son.

MONTGOMERY.—On March 29th, at South Park Hill-road, South Croydon, the wife of Stephen K. Montgomery, M.D., of a son.

NOURSE.—On April 3rd, the wife of H. E. Nourse, M.R.C.P., of Grange-road, Cambridge, of a son.

MARRIAGES.

BLAIKLEY—JOHNSON.—On April 2nd, at St. Stephen's Church, Guernsey, John Barnard Blaikley, F.R.C.S., to Vivien Maude, younger daughter of Edward Odlum Johnson, O.B.E., I.S.O., formerly of Sierra Leone.

SMITH—FOWLER.—On April 2nd, at St. Peter's, Eaton-square, George Francis Rawdon Smith, M.D., of Liverpool, to Ethel May Fowler, only child of the late James Stewart Fowler, M.D., of Edinburgh.

STEVENSON—LANG.—On March 31st, at Frimley Parish Church, Surrey, Douglas Stuart Stevenson, M.B.E., M.B., Ch.B., to Mary Edith, younger daughter of the late Captain E. L. Lang, Royal Navy, and the late Mrs. Lang, of Craig Bittern, by Dalbeattie.

STEWART—GREENWOOD.—On April 4th, F. M. Stewart, M.B., Ch.B. Edin., Littlemore, near Oxford, to Susan Helena Greenwood.

DEATHS.

MOONEY.—On March 26th, Alexander Patrick Mooney, M.D., J.P., M.B.E., of Preston, Lancs., aged 71.

NELIS.—On March 29th, at The Chalet, Teignmouth, Devon, William Francis Nelis, M.D., formerly Superintendent of the Newport Mental Hospital, Caerleon, Mon., aged 75.

ROBERTSON.—On March 28th, at Tipperlinn House, Morningside, Edinburgh, George Matthew Robertson, M.D., LL.D., F.R.C.P. Edin., F.R.C.S. Edin. (Hon.), Professor of Psychiatry in the University of Edinburgh, and Physician Superintendent of the Royal Edinburgh Hospital for Mental and Nervous Disorders.

SMITH.—On March 31st, James Edmund Smith, M.R.C.S., L.R.C.P., of Whitehead's-grove, Chelsea, S.W.

SOMERVILLE.—On March 30th, at Harrold, Bedford, Henry Inkerman Somerville, L.R.C.P., M.R.C.S., B.Sc. Lond., aged 76.

URQUHART.—On March 28th, at Cairo, Egypt, Alexander Lewis Urquhart, O.B.E., late Major, R.A.M.C., Professor of Pathology at the University of Cairo.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

FIRE AT A HOSPITAL.—Fire broke out last week in a ward of the Infectious Diseases Hospital at Oxford. The ward had been redecorated, and shortly after fires had been lighted and three patients moved in beams near a chimney were found to be on fire. The flames spread rapidly, but the patients were safely removed, and the fire brigade speedily put an end to the outbreak. A few of the helpers were slightly injured.